

R E P O R T R E S U M E S

ED 003 490

24

THE INFLUENCE OF SPEED AND PRIOR KNOWLEDGE AND EXPERIENCE ON ADULT LEARNING.

BY- SJOGREN, DOUGLAS D. KNOX, ALAN B.

NEBRASKA UNIV., LINCOLN

REPORT NUMBER CRP-2233

PUB DATE SEP 65

REPORT NUMBER BR-5-DD11

EDRS PRICE MF-\$0.27 HC-\$7.16 179P.

DESCRIPTORS- #ADULT EDUCATION, #ADULT STUDENTS, #PERFORMANCE, ACHIEVEMENT, TESTS, ACADEMIC PERFORMANCE, PROGRAMED INSTRUCTION, #LINEAR PROGRAMING, LEARNING PROCESSES, #AGE DIFFERENCES, SOCIOECONOMIC STATUS, PROGRAMED MATERIALS, ADULT PROGRAMS, FORTY EIGHT ITEM COUNSELOR EVALUATION TEST, WESCHLER ADULT INTELLIGENCE SCALE, LINCOLN, NEBRASKA, STRONG VOCATIONAL INTEREST BLANK, POE INVENTORY OF VALUES

SOME EFFECTS OF AGE ON ADULT LEARNING WERE STUDIED IN A SERIES OF FOUR EXPERIMENTS ON THE FOLLOWING VARIABLES--(1) SUSCEPTIBILITY TO SET-INDUCING CONDITIONS, (2) ATTITUDES ABOUT A TOPIC, (3) PRIOR KNOWLEDGE, AND (4) LEARNING SPEED OR EFFECTS OF VARIED PRESENTATION RATES. A REPRESENTATIVE SAMPLE OF 211 SUBJECTS WAS SELECTED ON THE BASIS OF SEX, AGE, PARTICIPATION IN ADULT EDUCATION, AND SOCIOECONOMIC STATUS. IN MOST CASES, EACH SUBJECT TOOK THE STRONG VOCATIONAL INTEREST BLANK, THE POE INVENTORY OF VALUES, THE 48 ITEM COUNSELOR EVALUATION TEST, AND THE WESCHLER ADULT INTELLIGENCE SCALE. TEN DIFFERENT SETS OF STUDY MATERIAL, RELATIVELY UNFAMILIAR AND INTERESTING, WERE SELECTED. LINEAR PROGRAMED INSTRUCTION MATERIAL WAS OBTAINED FROM THE UNIVERSITY OF NEBRASKA AND, AFTER REVISION, WAS ADMINISTERED TO THE SUBJECTS. RESULTS, WHICH SEEMED TO SHOW A CONSISTENCY ACROSS EXPERIMENTS, ARE DISCUSSED AND RELATED TO ADULT EDUCATION. THE MOST CONSISTENT RESULT WAS THE LACK OF APPARENT RELATIONSHIP BETWEEN AGE OF THE SUBJECT AND PERFORMANCE ON ANY OF THE CRITERION MEASURES. THIS PROVIDED EVIDENCE THAT THE OLDER ADULT IS NOT NECESSARILY HANDICAPPED WHEN COMPETING WITH A YOUNG ADULT IN A LEARNING SITUATION.

(JC)

ED003490

5-0011

THE INFLUENCE OF SPEED AND PRIOR KNOWLEDGE AND EXPERIENCE ON ADULT LEARNING

COOPERATIVE RESEARCH PROJECT NO. 2233

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Office of Education

This document has been reproduced exactly as received from the person or organization originating it. Points of view or opinions stated do not necessarily represent official Office of Education position or policy.

DOUGLAS, D. SJOGREN
ALAN B. KNOX

UNIVERSITY OF NEBRASKA
LINCOLN, NEBRASKA 68508

September, 1965

The research reported herein was supported by the Co-operative Research Program of the Office of Education, U. S. Department of Health, Education, and Welfare.

ACKNOWLEDGMENTS

Several individuals and groups provided a significant contribution to this project. A complete listing of all contributors is probably not possible, but we do want to especially acknowledge the contribution of the 208 participants who were most cooperative throughout the project. Personnel of the University Extension Division, the Lincoln Public Schools, the Lincoln Labor Temple, and the Lincoln Chamber of Commerce were especially helpful in the process of informing potential participants about the project.

Mr. Arden Grotelueschen has devoted much time to the project, and his work was invaluable to the success of the project. Other graduate students who worked on the project were: Iris Abel, Fred Bieck, Cora Mae Briggs, Dean Bryson, Alice Camp, Nick Claditis, Lois Dam, Don Frye, Virginia Hall, Nadine Kingman, Ruth Knox, Susan Lewis, Tom Lyons, Eudoris McDonald, Robert Muschewake, John Revolinski, Robert Schissel, and Dave Theissen.

Several secretaries and typists worked on various aspects of the project. These include Alice Connealy, Jean McAllister, MarVelle McCarron, and Janice Vasey.

This research study was made possible by support from the Cooperative Research Program of the U. S. Office of Education.

TABLE OF CONTENTS

CHAPTER	PAGE
I. OVERVIEW OF THE STUDY	1
Experiment Number One: Set.	2
Experiment Number Two: Attitude	5
Experiment Number Three: Prior Knowledge.	7
Experiment Number Four: Speed	10
II. GENERAL METHODOLOGY AND PROCEDURE	14
Sample Selection	14
Sample Characteristics Regarding Mental Ability.	17
Summary Description of Sample.	25
Selection of Learning Materials.	25
Sessions	27
III. RESULTS	30
Experiment One	35
Procedure	35
Analysis of Pretest Results	40
Criterion Measures.	44
General Analysis Plan of Criterion Measures	45
Analysis of Specific Subtest Results.	47
Analysis of Understanding Subtest Results	51
Analysis of Total Test Results.	57
Summary	58
Experiment Two	61
Procedure	62
Analysis of Pretest Results	63
Attitude Scale Construction	64
Analysis of Art Results	65
Analysis of Poetry Results.	69
Discussion of Attitude Study.	72
Experiment Three	72
Results	74
Summary	80
Experiment Four.	82
Analysis of Pretest Results	88
Analysis of Criterion Measures.	90
Summary	93

CHAPTER	PAGE
Other Results	95
IV. DISCUSSION	103
Limitations of the Study.	108
REFERENCES	110
APPENDIX A	113
APPENDIX B	120
APPENDIX C	122
APPENDIX D	161
APPENDIX D	166

LIST OF TABLES

TABLE		PAGE
1	Schematic of the Sample Classifications.	15
2	Schematic of Classifications Showing Number of Subjects in Each Cell.	16
3	Available and Computed Sources of Variation in the WAIS Analyses	18
4	Mean WAIS IQ's for Classifications	19
5	ANOVA (Analysis of Variance) of WAIS IQ's.	20
6	Mean WAIS Scaled Scores for Classifications.	22
7	ANOVA of WAIS Scaled Scores.	23
8	Means, Standard Deviations, and <i>t</i> Values on 10 Items Common to the Pretest, Criterion Tests, and Follow-up Test	32
9	Means, Standard Deviations, and <i>t</i> Values on 10 Item Pretest and Follow-up Test.	33
10	Assignment Within Cells to Condition and Session . . .	36
11	Raw Score Pretest Means, Experiment One.	40
12	ANOVA of Pretests, Experiment One.	41
13	Means of Significant Classes and Interactions on Experiment One Pretests	42
14	Estimated Reliabilities of Insurance, Government, and Stocks Tests Based on Test-retest Correlation. . .	44
15	Factors in Experiment One.	46
16	Analysis Plan, Degrees of Freedom, and Error Terms for Analyses in Tables 17, 19, and 21.	47
17	Specific Subtest ANOVA, Experiment One	48
18	Significant Classification and Interaction	49
19	ANOVA of General Subtest, Experiment One	52

TABLE		PAGE
20	Significant Classification and Interaction Means on General Items	53
21	ANOVA of Total Test in Experiment One.	57
22	Significant Classification and Interaction Means on Total Test.	58
23	Art Pretest ANOVA.	63
24	Poetry Pretest ANOVA	63
25	Correlation Matrix of Art Attitude and Achievement Tests and Age.	65
26	Art Attitude Scale Frequency Distribution by Age Groups.	66
27	Art Attitude Scale ANOVA	67
28	Art Achievement Test ANOVA	68
29	Significant Classification Means on Art Achievement Test	68
30	Pearson Product Moment Correlation Matrix of Poetry Attitude and Knowledge Tests and Age.	69
31	Frequency Distribution of Poetry Attitude Scale Scores by Age Groups	70
32	Poetry Attitude Scale ANOVA.	71
33	Poetry Achievement Test ANOVA.	71
34	Significant Classification Means on Poetry Achievement Test	72
35	Greek Test ANOVA	74
36	Condition Means on Greek Test.	74
37	Russian Test ANOVA of First 10 Items	76
38	Significant Classification Means and Other Means of Interest on First 10 Items of Russian Test	76

TABLE		PAGE
39	Russian Test ANOVA of Second 10 Items.	77
40	Classification Means of Interest on Second 10 Items of Russian Test.	78
41	Russian Test ANOVA of Total Test	78
42	Significant Classification Means on Russian Test and Other Means of Interest	79
43	Mean Times in Minutes, Standard Deviations, and Interquartile Ranges on Condition C by Topic	84
44	Study Time ANOVA, Experiment Four.	85
45	Significant Classification Mean Condition Time and Interaction Means for EC, PC, and AC	86
46	Pretest Means for Experiment Four.	88
47	ANOVA of Experiment Four Pretests.	89
48	Significant Classification Means on Pretests for Experiment Four.	89
49	Experiment Four ANOVA.	90
50	Significant Classification and Interaction Means on Experiment Four	91
51	Pearson r 's Between WAIS Scales and the First Administration of each Criterion Instrument by Sex	96
52	Significant Pearson r 's Between PIV Scales and First Administration of Criterion Instruments by Sex	97
53	Significant Pearson r 's Between 48 ICET Scales and First Administration of Criterion Instruments for Women.	98
54	Significant Correlations Between SVIB Scale Scores and Criterion Instruments for Women.	99
55	Significant Correlations Between SVIB Scale Scores and Criterion Instruments for Men.	100

LIST OF FIGURES

FIGURE		PAGE
1	Age by condition interaction on general and specific subtests.	54
2	Sex by condition interaction on interaction on general and specific subtests.	55
3	Significant interactions of condition with SES, PNP, and age on time taken in Experiment Four	87

CHAPTER I

OVERVIEW OF THE STUDY

Adult educators, today, are under constant pressure to develop formal adult education programs that are both effective and efficient. The difficulty, however, is not so much that of meeting the increasing demands by adults for educative activities as that of designing educational programs so that learning effectiveness and efficiency are optimized. Of course, this difficulty is not unique to the adult educator; it is one that is persistent through all levels and types of education. The adult educator, however, is less able to base his practices on research with the adults he serves than is the educator of young people based on research with the young people he serves. Consequently, the adult educator generally plans educational programs on the basis of evidence from the educational research that is available; research based on samples of children, adolescents, college sophomores, and to a limited extent on restricted samples of adults. We might add parenthetically that some adult education programs are influenced to an unfortunate extent by stereotypes of the adult as a learner.

The lack of educational research based on adult samples is not the fault of the adult educator. Indeed it is the adult educator who is providing much of the stimulus for increasing amounts of psychological, sociological, and educational research based on adult samples. The adult educator, with his pragmatic approach, has recognized that typical educational methods in the public school classroom are frequently not especially appropriate in the adult school, and he has increasingly turned to the social scientist for principles derived from theory and empirical research on which to base sound educational practices for adults.

It has been well established that the human organism changes physiologically and psychologically throughout the life span. Along with the organismic changes, there are environmental and social changes. Whether these changes should result in changing educational procedures for the adult is an important question. Relatively complete reviews of changes on psychological and sociological variables through adulthood are available in Kuhlen (1963), and in Burns (1964). A very complete review of psychological research on aging is provided in Birren (1959).

The studies reported in this paper were designed to identify any effects or relationships that certain variables, that have been shown to be age related, have on or with performance by adults in learning activities. Four studies were conducted with the same sample of adults.

The learning activities of the experiments were all with programmed instructional materials. The learning programs were of the type usually referred to as linear programs (Skinner, 1954). Programed materials were used because their use facilitated manipulation of variables. It is recognized, however, that the results are generalizable only to learning activities that involve programed instructional materials.

The four experiments are described and numbered in the order in which they were conducted within the total project. In designing this project our thinking was stimulated by our participation in a conference on the *Psychological Backgrounds of Adult Education* held at Syracuse University in 1962. Much of the rationale for the research was developed with the impetus received from the issues raised by papers presented at the conference.

Experiment Number One: Set

The idea of set or expectancy and its relation to learning has earned

increasing attention of researchers in recent years. Studies by Ausubel and his associates (1961, 1962, 1963), Heglin (1956), Lester (1932), Wimer (1960), and Wittrock (1963) among others, have consistently demonstrated that exposure of learners to certain materials before entering a learning task has an effect on learning performance. The materials used in the Ausubel studies were referred to as "organizers," but Wittrock demonstrated that the "organizers" may have operated as "set-inducers." In the other studies cited above, the materials were varied instructions for study that directed the attention of the learner in various ways.

The relationship between set and age on performance has been investigated by Botwinick (1959) and Brinley (1962). Botwinick observed an age related difference in susceptibility to set inducing conditions in a reaction time experiment. The older subjects performed best when the interval between a warning signal and the reaction signal was regular. Brinley studied the relationship between age and the ability to shift to different tasks. When speed of performance was held constant, there was no relationship between age and ability to shift tasks.

The results of the Brinley study were at variance with a study of rigidity by Chown (1961). Chown had found that age was related to measures of rigidity. Older subjects were apparently less willing to change behavior when a change was necessary for success at the task, and when the subject knew that a change was likely to be demanded. In Brinley's study such behavior was observed, but, instead of requiring the concept of rigidity to explain an apparent resistance to change manifested by slower performance, a general speed factor accounted for the variance.

Research, such as that cited above, suggested many implications relevant

to adult education. It appeared that the learner's attention, set, or expectancy was directed effectively by organizers or instructions in a way that increased learning effectiveness. It also appeared that the efficacy of these organizers or instructions might be age related. If rigidity is an age related variable, then it should follow that the older adult would be less susceptible to instructions or organizers designed to direct his attention, create a set, or establish an expectancy. The first experiment was designed to examine this problem.

Conditions. In the experiment, the subject was given a sheet of instructions to read prior to studying a learning program. The study instructions were written to direct the subject's attention to certain material in the program. The general nature of the instructions were as follows:

1. Condition A -- The subjects were informed about the content of the program and read comments expressing a hope that they would find the material interesting.

2. Condition B -- The subjects were informed about the content of the program and they were also told what they would be expected to know on a test administered after their study of the program. Specific terms and definitions were named and these were included on the test.

3. Condition C -- Condition C was the same as Condition B except that the subjects were told which generalizations they would be expected to recognize and which principles they should be able to apply, in responding to the test questions after their study. The test included questions on these generalizations and principles.

Three sets of programmed instructional materials were selected, each of about 140 frames. The topics were Life Insurance, Nebraska State

Government, and the Stock Market. Each subject studied each program once and they studied once under each condition. The criterion tests on each topic were in two parts, with one part consisting of items on definitions of terms, and the other on generalizations and principles. The two parts of the test were analyzed separately.

Hypotheses. The principle hypotheses for this experiment were as follows:

1. The age of the subject will be negatively related to test performance.
2. The attention directing conditions will have a differential effect on learning performance as measured by the criterion subtests. On the specific facts subtest, the condition means will be ordered as follows $B > C > A$, and on the generalizations subtest, the means will be ordered $C > B > A$.
3. There will be a significant interaction between condition of study and age on performance, with the younger person being more affected by the conditions than the older person.

The results are presented in detail in Chapter III, but the general results were that hypotheses one and two were not supported, and the results suggested an opposite interaction than hypothesized. The older subjects appeared more susceptible to the conditions than the younger subjects.

Experiment Number Two: Attitude

The second experiment was a correlational study rather than an experiment in which a variable was manipulated. This study was designed to examine another aspect of set or expectancy by observing the relationships between attitude about a topic and the performance on a test

covering the topic.

Several investigators have observed a relationship between attitudes and achievement, in general finding that a positive attitude toward some topic is conducive to higher achievement. An example of this type of study is the Levine and Murphy (1943) study on communism. Two recent studies by Fitzgerald and Ausubel (1963) and Garverick (1964) also reported this general relationship.

The consistent finding of a relationship between attitude and performance in learning activities seemed very pertinent to adult education, especially when the concept of rigidity was also considered. If the adult does in fact become more rigid with increased age, then it would seem reasonable to expect the older adult to become more rigid in his attitude toward certain topics. And if the older adult were more rigid in his attitude about a topic it would be expected that the performances of a group of older adults on a learning task related to the topic would have a different pattern than that of younger adults. Further, it would be expected that the older adults would show significantly less change in their attitude about a topic than the younger adults if their attitudes were to be measured prior to and after studying a topic.

The topic of art was selected for this study. An art attitude scale was developed for the study. The attitude scale was administered prior to studying a program on the "Logic of Drawing." The attitude scale was administered again after the program was studied along with an achievement test based on the learning program. A partial replication of this study was conducted using the topic of Poetry (Reid, et. al., 1963).

Hypotheses. The hypotheses of primary interest in this study are listed below.

1. The older adults will exhibit a tendency toward rigidity in their attitudes toward art. This tendency will be manifested by a bi-modal distribution of scores for the older subjects, a relatively flat curve for middle aged subjects, and a near normal distribution for the younger subjects. It was expected that the rigid person would be more likely to score at the extremes, thus the bi-modal curve predicted for the older subjects.

2. There will be a significant difference among the age groups in the amount of change in attitude scale scores from pretest to posttest. If the older adults were more rigid, they would exhibit less attitude change than the middle aged and younger subjects.

3. Performance on an achievement test, after studying a program on art will be positively related to the attitude toward art. This hypothesis was based on the fact that attitude and learning studies typically have reported such findings.

The results, discussed in detail in Chapter III, did not lend support to the three hypotheses in either the art study or the partial replication with poetry.

Experiment Number Three: Prior Knowledge

Another issue in relation to age and learning was the effect of previous learnings on subsequent learnings. Bugelski (1964) made the strong statement that "The important point to remember is that...children do not learn like adults." Bugelski's statement was based mainly on the idea that the larger number of previous learnings of the adult in response to a variety of stimuli make him different from the child as a learner. The effect of these prior learnings may be in either a desirable or an undesirable direction. Statements such as Bugelski's do not seem

unreasonable, but provide little help for the adult educator.

Answers to two kinds of questions are needed. The first question would be addressed to the problem of identifying those previous learnings that might be facilitative and those that might be inhibitive to subsequent learnings. The second question, and the one that we attacked, would be to attempt to determine whether there is an age related effect of prior learning on subsequent learning when holding the level of prior learning constant.

Some studies have been conducted regarding these questions with somewhat contradictory results. Ruch (1934) observed that older adults experienced more difficulty in performing a mirror vision rotary pursuit task. This difficulty was attributed to the greater consolidation of visual motor habits of older persons which made the mirror vision task more of a problem of reorganization of prior learned habits than for younger subjects. Korchin and Basowitz (1956) studied interference effects in verbal learning and found no greater effect for older persons. Gladis and Braun (1958) observed absolute differences in favor of older subjects on a paired associate task designed to produce maximum interference. When the scores were adjusted for vocabulary level and learning rate, however, the differences in the adjusted scores were in favor of the younger group. The adjustment effect due to vocabulary level suggested a powerful effect of prior learning on subsequent learning by adults even in such an artificial task as learning paired associates. Adults generally exhibit a continual increase in vocabulary level with age, and in the Gladis and Braun study it appeared that the vocabulary level was related to performance in the task, to the extent that much of the variance in learning the paired associate task was accounted for by variance in vocabulary level.

After considering the findings such as those cited above, we categorized the question of the effect of prior learning into the two questions. It first seemed reasonable to assume that what one knows affects what one can learn and thus to assume that one's performance in a learning activity is age related to the extent that the older a person becomes the more he knows and the more he knows the greater the effect on any acquisition of a specific bit of new information. The questions were then, as mentioned earlier, to identify facilitative and inhibitive prior knowledge and to find out whether any age related effect can be observed independent of prior knowledge.

In order to study the age related effect of prior experience on learning we decided to use an interference task. The task needed to be unfamiliar for all of the subjects and one that would be independent of vocabulary level. Nonsense syllables seemed to meet these criteria relatively well, but we wanted a task that was more related to what might be studied by adults. After some tryout of various materials we decided that the study of the English phonetic equivalents of certain Russian and Greek letters met the criteria. Accordingly, the set of the first 120 frames of the TMI-Grolier program (TMI, 1960) on Russian was selected as one topic. These 120 frames were then altered to produce an equivalent program on Greek by substituting the corresponding Greek letters in the frames. Thus, two programs were available that were on very similar topics, nearly equivalent regarding difficulty, and for which the English vocabulary level was quite low.

Conditions. The subjects studied the Russian program under one of the three conditions described below.

1. Condition A -- The subjects studied only the Russian program once and were tested.

2. Condition B -- The subjects studied the Greek program once, and one week later studied the Russian program and were tested.

3. Condition C -- The subjects studied the Greek program twice, with one week intervening. One week after the second session on Greek they studied the Russian program once and were tested.

A test on the Greek material revealed that the conditions resulted in differential learning of Greek by the groups with the condition means ordered $C > B > A$.

Hypotheses. The hypotheses for Experiment Three are listed below.

1. The study of Greek will have an interfering effect on the study of Russian and the effect will be linear with the number of times Greek was studied. Thus, the expected order of condition means on the Russian test was $A > B > C$.

2. When studying material that is independent of pre-experimental learning there will be no differences in performance among the age groups, based on an achievement test covering the learning material. We expected the performance on the Russian test to be unrelated to age.

3. The interfering conditions will have the same effect across the age groups. We expected no significant interaction between age groups and condition of study on the Russian test performance.

Hypothesis One was not supported by the data, but Hypotheses Two and Three were supported.

Experiment Number Four: Speed

Birren (1962), in commenting on age and performance on intelligence tests, made the observation that "information items have generally been shown to increase with age and perceptual and speed measures to

decrease" This comment was supported by Lorge (1936) and Miles (1934) with findings that adults did less well on timed mental ability tests than on those that were untimed. Such findings are often interpreted to mean that the adult is as intelligent as he was when younger, but things just take a little longer. If this is the case, it would seem that the amount an adult can learn in a specific time period would be less than when he was younger because he would be able to attend to less material in the learning situation.

The rate at which the individual works might also have a direct effect on the amount learned of the material to be studied. Birren made this point as follows: "A slow human or animal can stretch out the sequence of elements in a learning task which may seriously interfere with acquisition since temporal contiguity is an important aspect of learning." This statement seems to be commenting on something similar to the condition of learning which those in programmed learning discuss as immediate knowledge of results. Skinner (1954) stressed the importance of immediate knowledge of results, and experimental studies with animals have generally found that if a reinforcement is to be beneficial, it should come within five seconds after the response. Recent research, however, with human subjects does not support the necessity for immediate knowledge of results (cf. Meyer, 1960; Bilodeaus, 1959), and one group of experiments by Brackbill has demonstrated greater retention for a 10 second delay in knowledge of results than with immediate knowledge (Brackbill, et. al., 1964).

The purpose of Experiment Four was to examine the effect that varied rates of presentation of material would have on performance on an achievement test covering a program and whether the effect was age-related.

Three programs of approximately 100 frames were selected for use in the experiment. The programs dealt with the topics of Chanukah (Nulman, 1962), Solar System (Coronet, 1962) and Sets (Nichols, et. al., 1962).

Conditions. Each subject studied each program under one of three conditions so that each subject studied the three programs and they studied under each of the three conditions as described below.

1. Condition A -- The subject studied the program once at his own rate.
2. Condition B -- The subject studied the program once at his own rate except that he had to wait five seconds after making his response before he received knowledge of results.
3. Condition C -- The subject studied the program with a predetermined amount of time allowed for each frame and knowledge of results. The time per frame was established on the basis of the performance of a try-out group. Thus, all subjects studying under this condition proceeded through the program at the same rate.

In each condition the subjects made written responses. The conditions were imposed by an individual administration of the program by a session supervisor. The time taken by the subject was recorded by the supervisor. An analysis of the times taken in the three conditions indicated that the time conditions were imposed so that the mean condition times were in the following order: $B > A > C$.

Hypotheses. The primary hypotheses for Experiment Four were as follows:

1. The three conditions will account for a significant portion of the variance of the performance tests. We expected the condition means to be ordered with $A > B > C$.
2. Age will not be related to performance on the tests;

that is, the age classification will not account for a significant portion of the variance on the tests.

3. There will be a significant interaction between age and condition in the test performance. We expected Condition A to have equal means across the age groups; Condition B to affect the performance across age groups so that the age group means would be ordered old>middle>young; and Condition C to affect the performance so that the age group means would be ordered young>middle>old.

The results, presented in detail in Chapter III, supported Hypotheses One and Two, but offered no support to Hypothesis Three.

Much of the time devoted to this study was used in obtaining the sample of subjects and in selecting the learning materials. This aspect of the study is described in the next chapter.

CHAPTER II

GENERAL METHODOLOGY AND PROCEDURE

Sample Selection

The first phase of the series of studies was the selection of the sample. The original intent was to obtain a pool of 168 adults classified in the following ways into 24 cells with seven persons within each cell.

1. Sex.
2. Socio-economic status (SES). Two categories were used (high-low) with educational level and occupational type as the main criteria for categorization.
3. Previous participation in adult education (PNP). A subject was classified as a participant if he had engaged in an adult education activity during the previous two years. If he had not participated in such an activity in the previous five years, he was classified as a non-participant.
4. Age. Three categories were used; Under 31, 31-44, and 45-64.

The sex, SES, and PNP classifications were included because previous research had indicated that these variables were related to performance by adults in learning activities and thus would be expected to account for a significant portion of the variance in a measure of adult learning performance (cf. Knox and Sjogren, 1965; Sorenson, 1930). This use of a stratified sample, with these variables as controls would serve to reduce the error variance term in the analyses and thus make the significance tests of the age and condition classifications more precise.

Table 1 presents the classification scheme of the different sample characteristics.

Table 1

Schematic of the Sample Classifications

Age	Adult Education Participants				Adult Education Non-Participants			
	Male		Female		Male		Female	
	HISES	LoSES	HISES	LoSES	HISES	LoSES	HISES	LoSES
Under 31	7	7	7	7	7	7	7	7
31-44	7	7	7	7	7	7	7	7
45-65	7	7	7	7	7	7	7	7

In order to fill all of the above cells, it was obviously necessary to contact a large number of adults. Several groups of adults were contacted including service clubs, business groups, labor unions, church groups, adult high school and college classes, and servicemen at a nearby air base. Other contacts were made with a local newspaper story about the project, and many individual conversations about the project were held.

Those interested in participating in the project were asked to attend a meeting at which they were given specific information about the project. After hearing the description of the project, those still interested were asked to fill out a questionnaire that included questions pertinent to the classifications, a 15 item vocabulary test, and questions with respect to their knowledge about and interest in some possible topics for study in the project. A copy of the questionnaire is attached as Appendix A.

About 500 adults attended the information sessions and completed

the questionnaires. To protect against losses during the project and insure at least six subjects in each cell, it was decided to select nine for each cell or a total of 216 participants. However, nine subjects were not available for four of the cells so that 211 were selected rather than 216. Table 2 contains the numbers in each cell.

Table 2
Schematic of Classifications Showing Number
of Subjects in Each Cell

	Participants				Non-Participants			
	Male		Female		Male		Female	
	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo
Age								
Under 31	9	9	9	9	7	8(1)	9	9
31-44	9	9	9	9	9	9	9	9
45-65	9	8	9	9(1)	9	8(1)	9	9

Note.— The numbers in parentheses indicate the drop-outs.

We anticipated a 20 per cent drop-out rate in the project; however, only three subjects dropped. The cells from which they dropped are indicated in Table 2 by the number one in parentheses in three of the cells. The high completion rate was probably related somewhat to the fact that the participants were paid. They were informed that they would be paid \$60 on completion of the project. On an hourly basis the pay was a little over a dollar an hour because most subjects participated for about 50 hours of time.

The sample was not a random sample of an adult population, but was instead a stratified sample. Obvious deviations from a random sample are the equal numbers in the age groups and in the participant-non-participant groups. It did not seem unreasonable to assume, however,

that the sample in each cell was representative of all adults who possessed the combination of characteristics used to define the cell. However, this assumption regarding the similarity between the adults in each cell and the larger population of adults with similar characteristics is probably least tenable regarding interest in participating in this type of research project. Appendix B is a tabular presentation of some biographical characteristics of the selected project participants.

Sample Characteristics Regarding Mental Ability

The first session in the project, one session in the middle, and the last session were each devoted to testing. A 10 item pretest over each of the topics studied in the project was administered along with three standardized tests; the Strong Vocational Interest Blank, (Strong, 1951) the Poe Inventory of Values, (Poe, 1957) and the 48 Item Counselor Evaluation Test, (McMahon, 1963). The three standardized instruments were administered for two purposes. One purpose was to obtain baseline information for using this sample in subsequent longitudinal studies. The other purpose was to determine whether the scale scores on these instruments were correlated with the performance of the adults in the project. The correlations will be presented in Chapter III.

The Wechsler Adult Intelligence Scale (WAIS) was administered to each subject (Wechsler, 1955). The same qualified person administered all of the tests except for three that were given by the principal investigator. The WAIS was administered to serve as a control variable and also to provide baseline information for a longitudinal study.

Before discussing the WAIS analysis, the analysis procedures used in the study will be described.

We decided to consider the cells as the sampling unit, rather than individuals, so that all of the analyses presented in the study used

cell means as the raw data and the degrees of freedom for total are the number of cells in the analyses less one. This treatment of the analyses seemed appropriate for two reasons. The first reason was that although the sample was selected with an attempt at randomization, it

Table 3
Available and Computed Sources of Variation
in the WAIS Analyses

Available		Computed	
Source	df	Source	df
Sex (S)	1	Sex (S)	1
SES (E)	1	SES (E)	1
PNP (P)	1	PNP (P)	1
Age (A)	2	Age (A)	2
SE	1	SE	1
SP	1	SP	1
SA	2	SA	2
EP	1	EP	1
EA	2	EA	2
PA	2	PA	2
SEP	1	Error	<u>2</u>
SEA	2	TOTAL	23
SPA	2		
EPA	2		
SEPA	<u>2</u>		
TOTAL	23		

can at best be considered representative. Thus, considering the individual to be the sampling unit did not seem as appropriate as considering

the cell to be the sampling unit. The second reason for the method of analysis was that using the cell means allowed the use of all scores rather than eliminating scores to achieve equal or proportional frequencies in the cells.

Only the main effect and the two-way interaction sums of squares were obtained for each analysis. The analysis plan is presented in Table 3.

The above procedure was used because the main concerns were the variations due to the classifications. Also the computation of the complete analysis required the use of a rather unstable four-way interaction as an error term with only two degrees of freedom. It is likely that some of the three-way interactions would have been statistically significant when compared with the four-way interaction but it was felt that little confidence could be placed in any interpretation of them.

Table 4

Mean WAIS IQ's for Classifications

		Verbal	Performance	Full
Sex	M	115.76	114.41	116.20
	F	114.56	115.22	115.71
SES	Hi	118.10	116.99	118.70
	Lo	112.22	112.64	113.21
PNP	P	116.51	115.44	117.10
	NP	113.81	114.19	114.81
Age	Y	111.07	113.79	113.06
	M	113.25	111.22	113.24
	O	121.16	119.43	121.56

The mean squares for the two-way interactions were examined and any that were not significant at the .10 level when compared with the estimated error mean square were pooled with the error mean square (Winer, 1962). Consequently, the error degrees of freedom are not the

Table 5

ANOVA (Analysis of Variance) of WAIS IQ's

Source	df	SS	MS	F
Verbal				
Sex (S)	1	8.71	8.71	<1.00
SES (E)	1	207.33	207.33	11.30 **
PNP (P)	1	43.90	43.90	2.39
Age (A)	2	451.53	225.76	12.31 **
EP	1	88.32	88.32	4.54 *
Error	17	311.86	18.34	
Total	23	1111.65		
Performance				
S	1	3.88	3.88	<1.00
E	1	113.32	113.32	7.23 *
P	1	9.41	9.41	1.00
A	2	282.54	141.27	9.01 **
EP	1	44.36	44.36	2.84
EA	2	103.36	51.68	3.29
Error	15	235.04	15.67	
Total	23	791.91		
Full Scale				
S	1	1.42	1.42	<1.00
E	1	181.06	181.06	10.73 **
P	1	31.33	31.33	1.86
A	2	376.90	188.45	11.19 **
EP	1	80.37	80.37	4.77
Error	17	286.34	16.84	
Total	23	957.42		

Note.-- In all ANOVA tables one asterisk will indicate $p \leq .05$ and two asterisks for $p \leq .01$.

same for each analysis because the procedure used did not provide consistent results across the analyses.

The analyses of the WAIS results are included in Tables 4, 5, 6, and 7.

Table 4 contains the verbal, performance, and total mean IQ's for the classifications. The analyses of variance for these means are in Table 5.

The differences between the SES category means were significant at the .01 or .05 level in all three analyses. The mean IQ for the high SES group was higher than for the low SES group on the verbal, performance, and full scales. The comparisons among the age groups were significant at the .01 level in the three analyses. An examination of the means presented in Table 4 indicated that the older age group had considerably higher mean IQ's on the three scales than the other two age groups which were very similar to each other.

Because the WAIS IQ's are based on age norms, the analyses presented in Table 5 seemed somewhat misleading for a comparison of the age groups used in the study. The higher mean IQ's for the older age group could have resulted from the possibility that equivalent scaled scores could yield different IQ's when the age group norms were used. Consequently, we decided to analyze the scaled scores. The verbal, performance, and total mean scaled scores are in Table 6 and the analyses of these means are in Table 7.

The analyses of scaled scores did produce somewhat different results from the analyses of IQ's. A similar result was that the SES classification means accounted for a significant portion of the variance of the three scales with the high SES group scaled score means significantly higher in each comparison.

The differences between the age group means on the verbal and performance scaled scores were statistically significant, but the direction

Table 6

Mean WAIS Scaled Scores for Classifications

		Verbal	Performance	Full
Sex	M	75.54	56.73	132.34
	F	74.15	57.31	131.46
SES	H1	78.04	58.77	136.81
	Lo	71.65	55.27	127.00
PNP	P	76.33	57.72	134.11
	NP	73.36	56.33	129.69
Age	Y	71.63	60.38	132.13
	M	74.40	56.15	130.54
	O	78.51	54.54	133.05

of the differences was reversed so that the age group means on the full scaled scores did not differ significantly. The older age group had higher IQ's on all three scales, and when the scaled score means were compared, the older age group obtained the highest mean on the verbal scale but the younger age group obtained the lowest mean. However, the scaled score means on the performance scale were reversed in direction compared with the performance scale mean IQ's. The older age group had the highest mean IQ on the performance scale, but the performance scaled score mean of the older group was the lowest of the three, with the mean of the younger group the highest.

The results of the analyses of the verbal and performance scaled

scores seemed more consistent with results of previous studies than did the results from the comparisons of the IQ's. Verbal performance has

Table 7

ANOVA of WAIS Scaled Scores

Source	df	SS	MS	F
Verbal				
Sex (S)	1	11.62	11.62	<1.00
SES (E)	1	244.86	244.86	18.43 **
PNP (P)	1	52.81	52.81	3.98
Age (A)	2	191.74	95.87	7.22 **
SP	1	26.59	26.59	2.00
EP	1	74.98	74.98	5.64 *
Error	16	212.39	13.28	
Total	23	814.99		
Performance				
S	1	2.04	2.04	<1.00
E	1	73.33	73.33	9.45 **
P	1	11.52	11.52	1.48
A	2	145.86	72.93	9.39 **
EP	1	25.07	25.07	3.23
EA	2	58.44	29.22	3.76 *
Error	15	116.32	7.76	
Total	23	432.58		
Full Scale				
S	1	4.62	4.62	<1.00
E	1	576.34	576.34	19.33 **
P	1	117.00	117.00	3.92
A	2	25.82	12.91	1.00
EP	1	192.38	192.38	6.45 *
EA	2	183.27	91.64	3.07
Error	15	447.35	29.82	
Total	23	1546.78		

been shown to rise with age (Owens, 1953; Birren, 1963) whereas performance tests, especially those that involve a speed factor, have generally revealed a decline in score with age.

The IQ analysis did indicate that when the age subgroups in the

project are compared with their respective norm groups, the older age group was relatively higher than the other two groups.

The scaled score analyses indicated that when the age groups were compared with each other, the older age group's verbal ability was considerably higher than that for the younger age group, with the middle age group about halfway between. On the other hand, the younger age group scored higher than the older age group on the performance scale with the middle age group again in the middle. The full scaled score means were essentially equal for the three age groups and for the purposes of the study we considered the age groups to be equal in mental ability. It seemed reasonable that any advantages that might accrue to the older group because of their apparently greater verbal ability would be offset by disadvantages that might accrue from their apparent handicap in the performance area. The reverse of this argument would apply to the younger age group.

The sex and participation categories did not account for a significant portion of the variance in any of the analyses. The variance attributable to two of the interactions was consistently significant. The SES by FNP interaction was significant in the comparisons of verbal scaled means and full scaled means and approached the significant level on the performance scaled means. The SES by age interaction was significant on the performance scale comparisons. The significant SES by FNP interaction resulted because the participants in the low SES group had a higher mean than the non-participants whereas the means of participants and non-participants were virtually equal in the high SES group. The SES by age interaction on the performance scale reflected a relatively slight decline in means of the low SES category across age levels but a

rather large decline in means with age in the high SES group. These significant interactions seemed reasonable in view of other information about ability differences, but any interpretation should be made with the recognition that the sample was not drawn randomly from some larger population of adults.

Summary Description of Sample

A representative sample of 211 adults was selected. The bases for selection of the stratified sample were sex, age, participation in adult education, and socio-economic status. The goal was to obtain 216 adults classified into the 24 cells of a $2 \times 3 \times 2 \times 2$ factorial design with nine subjects in each cell. All of the cells were not filled because we lacked five of the 216, but at least seven were placed in each cell with nine in most. Of the 211 selected, 208 completed the project.

Each subject took the Strong Vocational Interest Blank, the Poe Inventory of Values, the 48 Item Counselor Evaluation Test, and the Wechsler Adult Intelligence Scale. Analyses of the WAIS results revealed that the SES classification accounted for a significant portion of the variance. The high SES group had higher mean ability scores than the low SES group. The sex, participation, and age classifications did not have significantly different ability means and the sub-groups of these classes were considered equal in ability in the analyses of experimental results.

Selection of Learning Materials

Ten different sets of study materials were needed for the project. The study material had to be such that it could be studied individually for about an hour and also be relatively unfamiliar, or at least contain

new information, for most of the adults. We, of course, wanted material that would be interesting and stimulating to most of the adults as well as material that would allow them to learn something. For each of the experiments it was important that the topics be somewhat related, although not interdependent. In one experiment the different materials had to be very similar in some respects.

We decided that linear programs (programed instructional materials) would meet the requirement of individual materials and several linear programs were reviewed. Ten programs were available from a previous research project at the University of Nebraska (Stake and Sjogren, 1964) and about that many more were obtained from other sources. A preliminary version of each of the programs was studied by some adults in a near-by town. Five to ten adults took each program. Each adult in the try-out group rated the program as to interest and how much they felt they had learned, and they took a brief test covering the content. Time spent studying was obtained also. Certain of the programs had to be changed so that more information was taught. This was usually accomplished by condensing early portions of the program into a paragraph or two to be read and adding new material at the end of the program. In this way, the programs did not become overly long.

Following is a list of the programs selected and the number of frames in each.

Program	Frames
Experiment One	
Principles of Insurance	155
Nebraska State Government	147
Stock Market	135

Experiment Two

Logic of Art	146
Poetry	121

Experiment Three

Greek	104
Russian	104

Experiment Four

Sets	116
Solar System	121
Chanukah	99

Sessions

When the sample had been selected, a time schedule for the project sessions was arranged. The sessions were scheduled to last two hours with about 40 minutes devoted to testing, and the remaining 80 minutes to study. The sessions were held on four mornings, two afternoons, and every evening Monday through Friday. Arrangements were made for each person to attend one session a week at the same time each week. A person who missed a regular session was either assigned to another session, or individual arrangements were made. With few exceptions, persons who had to miss their regular session attended the make-up session in the same week.

Two well-lighted classrooms were used for the study. One classroom had a rated student capacity of 60 and the other 40. The largest group session consisted of 28 subjects so that each subject had sufficient space to work comfortably at the desk or table.

The sessions were scheduled two weeks apart for the first experiment, or for about eight weeks. For the remainder of the project, weekly sessions were held. The weekly sessions made it easier for the subjects because they could schedule themselves more conveniently. The

weekly sessions increased apparent interest in the project, and we were able to complete the project sessions by early summer so that conflicts with vacations were minimized.

One session at the beginning of the project, one in the middle, and one at the end, were each devoted entirely to testing. The Strong Vocational Interest Blank and ten item pretests covering the first five topics that were studied, were administered in the first testing session. The subjects took the 10 item pretests over the other five topics along with the Poe Inventory of Values and an attitude scale toward art and one toward poetry during the second testing session. The last testing session, the final session in the project, was devoted to a test covering the topic studied the previous week, the 48 Item Counselor Evaluation Test, and a questionnaire about reactions to the project. The WAIS was administered on an individual basis.

The 12 regular study sessions were generally organized so that in the first 20 minutes a test was administered covering the topic studied during the previous session. The session topic was then studied for 60 to 80 minutes and an immediate test was given over that topic during the final 20 minutes. A time limit on study time was imposed in only one of the experiments; in the others the 60 to 80 minute study time mentioned above is the time taken by most subjects. The general procedures for each experiment are described in the section of the report dealing with each experiment.

Four graduate assistants served as session supervisors and handed out the study materials and administered the tests. Although the sessions were group sessions, the subjects studied the materials individually. There were no lectures or group discussions; only linearly

programed materials were studied.

The results of each of the experiments are presented in the next chapter.

CHAPTER III

RESULTS

In this chapter each experiment will be described separately in terms of procedure and results. Because the sample for each experiment was the same, it was expected that the comparisons on the classification factors would be consistent across the experiments. For example a difference between the means of the socio-economic groups in Experiment One would lead one to expect the same difference in means in the other experiments. The comparisons across experiments will be discussed after presentation of the results of the four experiments. The final portion of the chapter will contain information about relationships between certain variable measures.

Before presenting the results of each experiment, evidence is presented that learning did occur in the experiments. One basis for concluding that the subjects learned was from their performance on the retests administered one or two weeks after studying a particular learning program. The retest was administered for the primary purpose of studying retention, but we also reasoned that a drop in scores from test to retest would be indicative of the occurrence of immediate learning during the study of the program. If learning had not occurred then the immediate test and the retest scores would have been expected to have been equal. If learning had taken place then the immediate test scores would have been expected to have been higher than the retest scores because of the forgetting that would have occurred in the interval. The subjects were asked not to study material related to the topic in the

one or two week interval between sessions. In each analysis, the test means were significantly higher than the retest means which indicated that the subjects heeded the request not to study the topic between sessions. Also, based on the foregoing reasoning, this finding supported the belief that the subjects learned during the sessions. There is, of course, another line of reasoning that might explain the drop in test-retest means. If the drop occurred it would indicate that something systematic occurred between the test and retest that served to inhibit the performance on the retest and in fact lowered the level of performance below the level that would have been attained prior to studying the program. This line of reasoning seemed less sound than the one we accepted.

Further evidence to support the assumption that the subjects learned from the study is provided by the data in Tables 8 and 9. The data are subdivided into the experimental condition means for each topic.

The 20 item criterion tests over the topics included in Table 8 contained the 10 items in the pretest and 10 other items. The 10 common items were scored separately and correlated 5 tests were made between the pretest means and the test and retest means. The test and retest means on the 10 items were higher than the pretest means on all of the tests at less than the .01 level of significance which further supported the assumption that learning took place in the study.

Some six months after the project, we sent the pretests in all of the topics to the subjects and asked them to take them at home and return them by mail. The purpose of this follow-up test was to obtain evidence on long-term retention and also to obtain evidence on whether the assumption could be supported that learning had occurred in the study sessions

Table 8

Means, Standard Deviations, and *t* Values on 10 Items Common to
the Pretest, Criterion Tests, and Follow-up Test

Topic	Experimental Condition	(1)		(2)		(3)		(4)		<i>t</i> Values of Test Comparisons ^a			
		Pretest <i>M</i>	Pretest <i>SD</i>	Test I <i>M</i>	Test I <i>SD</i>	Test II <i>M</i>	Test II <i>SD</i>	Follow-up <i>M</i>	Follow-up <i>SD</i>	<i>N</i>	1-2	1-3	1-4 2-4
Poetry	---	4.58	1.83	8.69	1.21	---	---	6.45	1.44	179	30.28	---	13.36 16.00
Solar	A	5.33	2.29	8.69	1.32	8.47	1.32	6.91	2.35	59	9.88	9.23	6.58 4.46
	B	5.68	2.04	8.41	1.35	8.17	1.34	7.30	1.61	60	8.81	8.03	6.23 3.22
	C	5.88	1.88	8.30	1.40	7.91	1.52	7.31	1.53	60	7.81	6.55	5.96 2.14
Sats	A	3.63	2.44	7.66	1.75	7.30	2.17	5.61	2.44	60	13.23	11.12	9.61 4.57
	B	2.91	2.47	7.52	1.88	6.85	2.08	5.64	2.23	59	11.52	9.37	7.58 3.10
	C	2.45	2.12	6.92	2.07	6.45	2.67	4.96	2.40	60	11.76	9.09	7.38 3.22
Chanukah	A	2.83	1.45	9.14	.89	8.64	1.12	5.83	1.62	60	28.68	24.21	10.71 10.81
	B	2.90	1.44	8.79	1.23	8.18	1.48	5.73	1.28	60	23.56	19.56	11.32 9.80
	C	3.54	1.77	8.65	1.29	8.04	1.62	5.67	1.56	59	17.62	14.51	8.87 8.17

Note.--- Pretest, Test I, and Test II means based on 208 scores; follow-up means based on 179 scores.

^aAll *t* values are significant at .01 level.

on the topics in Table 9. It was recognized that the follow-up tests were not administered under controlled conditions but the subjects were familiar with the testing procedures and the instructions were such that the subjects were asked to take the tests in a manner similar to the procedures used in the project. The follow-up test means might also have been affected somewhat by some of the subjects having studied the topic more after the project was completed. The follow-up tests were not expected by the subjects. Of the 208 subjects in the project, 179 completed and returned the follow-up tests. The pretest and criterion

Table 9

Means, Standard Deviations, and t Values

On 10 Item Pretest and Follow-up Test

Topic	Experimental Condition	Pretest			Follow-up		t^a
		N	M	SD	N	SD	
Insurance	A	58	5.58	1.45	6.87	1.53	6.14
	B	60	5.86	1.66	7.33	1.46	6.39
	C	61	6.11	1.54	7.03	1.43	4.60
Government	A	61	6.14	1.86	7.62	1.58	6.73
	B	58	6.41	1.83	7.39	1.55	4.90
	C	60	6.03	1.98	7.51	1.45	5.48
Stocks	A	60	5.76	2.10	6.90	1.65	4.07
	B	61	5.83	2.15	7.11	1.84	4.74
	C	58	5.48	1.94	6.98	1.80	5.55
Russian	A	56	.04	.26	.67	1.25	3.85
	B	64	.11	.78	.88	1.36	4.05
	C	59	.04	.37	.70	1.41	3.47
Greek	A	56	.12	.70	.29	.87	1.13
	B	64	.32	1.50	1.08	1.36	3.04
	C	59	.03	.24	.60	1.12	3.80
Art	---	179	4.27	1.95	5.33	1.76	7.07

Note.-- Pretest means based on 208 scores; follow-up means on 179 scores.

^aAll t values except Greek, Condition A, are significant at .01 level.

scores of the 29 who failed to send in the follow-up test were compared with the scores of the 179 who did send in the follow-up tests and no differences were observed. It is notable that of the 179 follow-up tests, no subject had a lower follow-up test score than pretest score.

The follow-up test data for the topics in Table 8 were compared with the pretest data and the criterion test data. The follow-up test means were significantly higher than the pretest means for all topics. The poetry follow-up mean was significantly lower than the poetry criterion test mean on the 10 common items. For the other three topics in Table 8, we compared the follow-up mean with the retest mean and observed a significant drop in means from retest to follow-up.

The data in Table 9 are for the pretest and follow-up test of the topics not included in Table 8. The criterion tests for these topics did not include any items common to the pretest. The follow-up test means were significantly higher than the pretest means in all comparisons except Greek, Condition A. This Greek condition was the one in which the subjects did not study the Greek program. It should be mentioned, that, although the Russian and Greek means were higher on the follow-up test than on the pretest, there were many zero scores on the follow-up tests and the distributions of both the pretest and follow-up test were very positively skewed. The Greek and Russian pretests were completion type rather than multiple choice.

The data in Tables 8 and 9 were consistent in showing a significant gain in means from pretest to criterion or follow-up test. Recognizing the limitations on the quality of the data mentioned earlier, the data seemed to support the assumption that the subjects learned a significant amount in the study sessions.

Experiment One

Several research studies have demonstrated that set or expectancy is related to the performance of humans in a learning situation. Some of the studies related to this question were reviewed in Chapter I of this report.

The purpose of the first experiment was to ascertain the effect of reading different paragraphs prior to the study of a program. The treatment materials were written to create different sets or expectancies. The influence of this differential treatment was measured by a test administered following study of the program and on a retest given two weeks later. Whether the paragraphs were set determiners, organizers "a la Ausubel," or something else cannot be concluded, but they were written so that from two of them the subject could have been alerted as to the content of the test. The purpose of the retest was to find out the extent to which retention was related to the imposed conditions, to age, and to interactions of condition and age with other variables.

Procedure. The study was designed so that each subject studied under each of three conditions. Three topics were used: Insurance, Nebraska State Government, and Stock Market. In each cell, for the first session one-third studied under Condition A, one-third under Condition B, and one-third under Condition C. All studied the government program. In the second session the thirds established for the first session switched conditions and all studied insurance. The third session entailed a study of the stock market and each third of the group studied under the condition under which they had not previously studied. Table 10 presents the procedure for one cell with the Roman numerals indicating the different thirds.

The thirds within a cell were assigned to the cells in a random manner for the first session. The three groups thus established did not change for the other two sessions. If there were nine in a cell the assignment was made by numbering each person, drawing numbers from a hat, and assigning the first number to Condition A, the second to Condition B, and so on. With fewer than nine in a cell two draws were made on the last time through. That is, six numbers were first drawn which placed two in each condition. To establish in what condition the remaining one or two persons in the cell would be, another draw was made with the number on the slip indicating the condition.

Table 10

Assignment Within Cells to Condition and Session

	Session 1	Session 2	Session 3
	Government	Insurance	Stock Market
Condition A	I	III	II
Condition B	II	I	III
Condition C	III	II	I

In the first session of the experiment the subject was given the programed study material for that session and a sheet on which the study instructions were written. The instructions were read by the subject and, after reading them, the subject studied the program through once, making written responses. The instructions provided the conditions for the experiment.

The conditions or instructions for study for the first session are written below.

1. Condition A -- The study materials for this session are on the topic, "Life Insurance." Some, or much, of the information may be familiar to you or it may all be relatively new or it may be

material you once knew but have since forgotten. In any case, we hope you find the study of the materials interesting and rewarding.

2. Condition B -- The study materials for this session are on the topic, "Life Insurance." When you finish studying these materials you will be tested on the meanings of several terms and on certain specific ideas and procedures. You will study the following information in the program.
 - a. The meaning of terms such as economic resource, potential asset, policy holder, claim, single premium, step-rate premium, gross premium, and risk.
 - b. How to determine the probability of dying.
 - c. The basic kinds of life insurance policies.
 - d. The non-forfeiture provisions of policies.
 - e. Specific advantages of life insurance over other economic resources.
 - f. How premiums are computed.
3. Condition C -- The study materials for this session are on the topic "Life Insurance." You will study many specific details in the materials. However, while studying the materials, you should think about the reasons for certain rules or procedures, various applications of some of the details, and relationships between the items of information covered. Some examples of questions to think about are listed below:
 - a. What are the advantages of life insurance over other economic resources?
 - b. What are the economic principles on which insurance is based?
 - c. What is the relationship between probability of dying and computation of premiums?
 - d. What are the advantages and likely applications of each of the premium payment methods?
 - e. How does insurance need differ among individuals?
 - f. How can the basic policies be effectively combined into package policies?
 - g. How are insurance companies able to provide the non-forfeiture provisions?

Immediately after studying the program the subject took a 25 item multiple choice test over the material studied.

The procedure for the second session, two weeks later, was similar to the first session except that in addition the 25 item test covering the topic studied two weeks previously was readministered. This test was the first task done in the session. The subjects then read an instruction

sheet for the second session setting the conditions for study. Those who had the Condition A instructions in the first session had Condition C instructions in the second session, those with Condition B in session one had Condition A in session two, and those with Condition C in session one had Condition B in session two. The instructions for the second session are presented below.

1. Condition A -- The study materials for this session are on the topic Nebraska State Government. Some or much of the information may be familiar to you or it may all be relatively new or material you once knew but have since forgotten. In any case we hope you find the study of the materials interesting and rewarding.
2. Condition B -- The study materials for this session are on the topic Nebraska State Government. When you finish studying these materials you will be tested on the meanings of several terms and on certain specific ideas and procedures. You will study the following information in the program.
 - a. The meaning of terms such as unicameral, senator, initiative, referendum, Nebraska Legislative Journal, non-partisan, veto, emergency clause, and original and appellate jurisdiction.
 - b. Some of the duties of several officials such as the Governor, Lieutenant Governor, Speaker, Clerk, and Judges.
 - c. The requirements to be met by a person who wants to be elected to the state legislature.
 - d. The requirements of valid initiative and referendum petitions.
 - e. The procedure for introducing a bill and over-riding a veto.
 - f. The number of state senators.
 - g. The meeting dates of special sessions and regular sessions.
 - h. The kinds of courts in the state.
3. Condition C -- The study materials for this session are on the topic, Nebraska State Government. You will study many specific detail in the materials. However, while studying the materials you should think about the reasons for certain rules or procedures, various applications of some of the details, and relationships between the items of information covered. Some examples of questions to think about are listed below.
 - a. What is the principle underlying the power of veto and the procedure for over-riding a veto?
 - b. What is the reason for having a non-partisan legislature?
 - c. Why is there no veto over a law passed by initiative?
 - d. When might a special session of the legislature be called?
 - e. What is the reason for the requirements for a valid initiative or referendum petition?

- f. What are the advantages of the committee organization of the legislature?
- g. When might the emergency clause be used?
- h. Why was the election of judges replaced by a partial appointive system?
- i. What is the difference between appellate and original jurisdiction?

A 25 item multiple choice test was administered over the topic studied in session two immediately after the program had been studied once. The subjects made written responses to the program.

The third session, held two weeks after the second, was organized as the second with a retesting covering the previous session's topic, reading the condition instructions, studying the program once for the session making written responses, and an immediate testing over the topic studied. The subjects studied under the condition that they had not used in the two previous sessions. The instructions for the third session are presented below.

1. Condition A -- The study materials for this session are on the topic, "How to Follow the Stock Market." Some or much of the information may be familiar to you, or it may all be relatively new or material you once knew but have since forgotten. In any case, we hope you find the study of the materials interesting and rewarding.
2. Condition B -- The study materials for this session are on the topic, "How to Follow the Stock Market." When you finish these materials you will be tested on the meanings of several terms and on certain specific ideas and procedures. You will study the following information in the program.
 - a. The meaning of terms such as common stock, preferred stock, "bear," "bull," bond, blue chip stock, dividend, point, securities, lots, and paper profits.
 - b. The functions of a stock broker.
 - c. The information contained in stock quotations in the newspaper.
 - d. The various techniques used in the stock market such as good till cancelled order, stop order, trail a stop, selling short, buying on a margin, profit taking, and options.

3. Condition C -- The study materials for this session are on the topic, "How to Follow the Stock Market." You will study many specific details in the materials. However, while studying the materials, you should think about the reasons for certain rules or procedures, various applications of some of the details, and relationships between the items of information covered. Some examples of questions to think about are listed below.

- a. What kinds of situations might result in "bull" or "bear" markets?
- b. Which techniques would likely be used by speculators and which by investors?
- c. How to read and interpret stock market quotations in the newspaper.
- d. What relationship does supply and demand have with the stock market?
- e. In what situations would a particular technique such as "selling short" be appropriate or inappropriate?

The retest for the third session was administered two weeks later.

Analysis of Pretest Results. In the first session of the project 10 item multiple choice pretests were administered to the subjects to obtain evidence of prior knowledge of the topics studied. The raw score means on these pretests are in Table 11.

Table 11

Raw Score Pretest Means, Experiment One

Insurance	5.69
Government	6.14
Stocks	5.59

The mean chance score on a 10 item, four choice, multiple choice test is 2.5 so the mean scores on the pretests were between three and four points above the chance level, but there was apparent opportunity for additional learning to take place.

The pretest scores were transformed to standard scores with a mean of 50 and a standard deviation of 10. The standard scores for each topic were subjected to an analysis of variance with the cell mean

Table 12
ANOVA of Pretests, Experiment One

Insurance				
Source	df	SS	MS	F
Sex (S)	1	2.34	2.34	<1.00
SES (E)	1	20.30	20.30	1.87
PNP (P)	1	63.93	63.93	5.89 *
Age (A)	2	3.63	1.82	<1.00
EP	1	66.97	66.97	6.17
Error	17	184.46	10.85	
Total	23	341.63		
Government				
S	1	45.57	45.57	4.98 *
E	1	159.91	159.91	17.50 **
P	1	91.14	91.14	9.97 **
A	2	52.72	26.36	2.88
SA	2	60.48	30.24	3.31
EP	1	29.99	29.99	3.28
EA	2	45.29	22.64	2.48
Error	13	118.81	9.14	
Total	23	603.91		
Stocks				
S	1	201.43	201.43	44.17 **
E	1	122.09	122.09	26.77 **
P	1	61.60	61.60	13.51 **
A	2	131.45	65.23	14.30 **
SE	1	26.86	26.86	5.89 *
EP	1	17.49	17.49	3.84
PA	2	42.83	21.41	4.70 *
Error	14	63.87	4.56	
Total	23	667.62		

as the input data. The classifications for the analyses were the four used in sample selection: sex, SES, PNP, and age.

The three analyses of variance are presented in Table 12. In each analysis only the classification and two-way interaction sums of squares were obtained and the four available three-way interactions were pooled

with the four-way interaction for the error term estimate. Then all two-way interactions with a mean square yielding an F ratio with $p > .10$ when compared with the estimated error mean square were pooled with the error mean square as the final estimate of error. Thus, the analyses

Table 13
Means of Significant Classes and Interactions
on Experiment One Pretests
Insurance

FNP			FNP X SES		
F	NP		F	NP	
51.64	48.37		HI 50.89	32.39	
			Lo 50.96	45.78	
Government					
Sex		SES		FNP	
H	F	HI	Lo	F	NP
51.35	48.60	52.35	47.39	51.92	46.02
Stocks					
Sex		SES		FNP	
H	F	HI	Lo		
52.82	47.02	52.17	47.66		
Age			FNP		
Y	H	O	F	NP	
47.51	49.15	53.09	51.32	48.32	
Age X FNP			Sex X SES		
Y	H	O	H	F	
F 50.55	48.97	55.04	HI 56.13	48.22	
NP 44.48	49.33	51.14	Lo 49.50	45.82	

in Table 12 differ somewhat in the number of interaction terms included. The classification and significant interaction mean standard scores for each topic are presented in Table 13.

The PWP classification accounted for a significant portion of the variance in each analysis with a higher mean for the participants' than for the non-participants' in each instance. The socio-economic class accounted for a highly significant portion of the variance on the government and stock market pretests with higher means for the high SES group than for the low SES group. The sex and age classes accounted for a significant portion of the variance on the stock market pretest with the men scoring higher than the women and the age means ordered old > middle > young.

Three interactions were significant: the SES by PWP interaction on the insurance pretest, and the SES by sex, and the PWP by age interactions on the stocks pretest.

The WAIS analyses presented in Chapter II and these pretest results provided an indication of what might be expected in the results of the experiment. The significant difference between means on the WAIS scales and two of the three pretests of the high and low SES groups led to the expectation that the SES classification would account for a significant portion of the criterion test variance. The significant difference between the participants' and non-participants' means on the three pretests also was suggestive of a similar finding on the criterion. Also, if sex and age differences were to be obtained on the criterion measure, some of this difference might be attributable to the differences on the stock market pretest although significant differences on but one of the four control variables should not be as influential on the final

results as those classifications with differences on more than one of the control variables.

Criterion Measures. A 25 item multiple choice test was constructed for each topic. Each test was in two parts with thirteen of the items designed to test knowledge of specific terms and concepts taught in the program, and twelve of the items written to test the understanding and application of principles and generalizations presented in the program. The specific items were the first thirteen and the understanding items were the last twelve. The criterion tests for Experiment One are in Appendix C along with the criterion measures used in the three other experiments.

An estimate of the test-retest reliability of the test was available from the immediate administration and the retest two weeks later. The reliability estimates for each part of the tests and for the total tests are presented in Table 14 as Pearson correlation coefficients between test and retest.

Table 14

Estimated Reliabilities of Insurance, Government, and Stocks
Tests Based on Test-retest Correlation

Topic	Total	Specific Subtest	General Subtest
Insurance	.76	.60	.71
Government	.72	.56	.66
Stocks	.77	.71	.55

The reliability estimates were quite consistent for each of the tests and seemed satisfactory. We considered the estimates to be conservative because of the possibility of differential experiences by the

group between the test and the retest with respect to the topics studied.

General Analysis Plan of Criterion Measures. Three analyses of variance were made of the data: one based on the scores on the specific items, one on the general items, and one on total test score. For the analyses, the scores of the two administrations of the two subtests and of the total test were each combined into one distribution, and the means and standard deviations of the combined distributions were computed. The raw scores were then transformed into standard scores with a mean of 50 and a standard deviation of 10. With this procedure, variance due to topics was eliminated because the mean for each topic was 50.

Each subject had eighteen scores at the end of the experiment: test and retest scores on three specific subtests, three understanding subtests, and three total tests. A test and retest score on the two subtests and the total test was obtained on each of the three topics and each of the three conditions. The variance due to topics was eliminated as mentioned above, but the variance due to conditions was obtainable. Referring to Table 10, those subjects in Group I had test and retest scores on the specific and understanding subtests over the government program as well as total test and retest scores. These scores were obtained under study Condition A. Group I had test and retest scores on the total and two subtests over insurance under study Condition B, and their test and retest scores over the stock market were obtained under study Condition C.

Three analyses of variance were made: one of the specific subtest scores, one of the understandings subtests scores, and one of the total test scores. The group within cells was considered as the unit of analysis so that the scores used in the analyses were the group means based on two or

Table 13

Factors in Experiment One

Factor	Abbreviation in Analysis	Number of Categories	Category Names
Participation in Adult Education	P	2	Participant, non-participant
Sex	S	2	Male, female
Socio-Economic Status	E	2	High, low
Age	A	3	Young, middle, old
Test	T	2	Test, retest
Condition	C	3	Nondirective, specific, general
Group	G	72	

three cases in each for each session. The group means were used for the analyses given in the discussion of the WAIS analysis.

The design was a $2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3$ factorial design with repeated measures. All factors were considered as fixed effects except the group factor. The groups were nested within the sex, age, PEP, and SES classifications. Only the first and second order interactions were computed. The topic factor was not considered in the analysis because the means of this factor were made equal. Any interaction of this factor with other factors was assumed to be zero and was pooled into the error estimate.

Table 13 lists the factors and the categories, and Table 14 presents the analysis design and the error terms used.

Table 16
Analysis Plan, Degrees of Freedom, and Error Terms
for Analyses in Tables 17, 19, and 21

Source	df	Source	df
Groups	(71)	EAT	2
Sex (S)	1	FAT	2
SES (E)	1	Error b	57
PNP (P)	1	Condition (C)	2
Age (A)	2	Groups X C	(142)
SE	1	EC	2
SP	1	EC	2
SA	2	PC	2
EP	1	AC	4
EA	2	SEC	2
PA	2	SFC	2
SEP	1	SAC	4
SEA	2	EPC	2
EPA	2	EAC	4
Error a	32	PAC	4
Test (T)	1	Error c	114
Groups X T	(71)	TC	2
ST	1	Groups X T X C	(142)
ET	1	STC	2
PT	1	ETC	2
AT	2	FTC	2
SET	1	ATC	4
SPT	1	Error d	132
SAT	2		
EPT	1	Total	431

Analysis of Specific Subtest Results. Table 17 contains data from the analysis of the specific subtest variance. The table contains the variance estimates obtained for each of the factors, and the variance estimates for those interactions that yielded an F ratio with $p < .10$. The level of significance set for a result to be considered statistically significant was $p < .05$. The means for the factor categories and the significant interactions are included in Table 18. The conservative test according to Winer (1962) was made with the test and condition factors because of the repeated measures across these classes.

Table 17

Specific Subtest ANOVA, Experiment One

Source	df	SS	MS	F
Sex (S)	1	587.77	587.77	6.39 *
SES (E)	1	1754.58	1754.58	19.08 **
PNP (P)	1	491.73	491.73	5.25 *
Age (A)	2	65.39	32.80	<1.00
EP	1	368.45	368.45	4.01 *
EA	2	525.72	262.86	2.86
Error (a)	63	5794.37	91.97	
Condition (C)	2	21.63	10.82	<1.00
SC	2	77.98	38.99	2.12
AC	4	144.51	36.13	1.97
PAC	4	372.42	93.10	5.07 **
Error (b)	122	2428.43	19.90	
Test (T)	1	2660.13	2660.13	241.61 **
ST	1	183.59	183.59	16.67 **
AT	2	48.56	24.28	2.20
RPT	1	44.70	44.70	4.06 *
Error (c)	67	727.49	11.01	
TC	2	1.32	.66	<1.00
ATC	4	135.46	33.68	2.19
Error (d)	138	2123.45	15.39	
Total	431	18566.10		

In the statements of hypotheses for this experiment, we indicated that our primary interest was in ascertaining whether the condition means, the age group means, and the condition by age interaction accounted for a significant portion of the total variance. The analysis presented in Table 17 demonstrated that the instructions for study (conditions) had no more than a chance effect on the specific subtest scores. It apparently made no difference on the specific subtest performance if the subjects had been instructed to remember certain specific bits of information or if they had been instructed to attend to understandings or just to enjoy the study.

The age classification did not contribute significantly to the total variance. The performance of the three age groups on the

Table 18
Significant Classification and Interaction

Means on Specific Items

Sex		SES		SES X PNP	
M	F	H1	Lo	H1	Lo
51.19	48.06	52.04	48.01	F 52.19	50.00
				NP 51.90	46.02
PNP		Test		Sex X Test	
P	NP	T	RT	M	F
51.09	48.96	52.51	47.54	T 53.02	51.99
				RT 49.36	45.73

PNP X Age X Condition

	P			NP		
	T	M	O	T	M	O
A	53.52	49.47	50.53	47.17	50.47	47.34
B	50.09	52.29	51.55	49.73	48.55	49.59
C	50.68	51.68	50.03	47.07	51.00	49.73

PNP X SES X Test

	P		NP	
	H1	Lo	H1	Lo
T	53.10	52.25	53.97	48.71
RT	49.27	47.76	49.82	43.33

Other Means of Primary Interest

Conditions			Age		
A	B	C	T	M	O
49.75	50.30	50.03	49.75	50.58	49.79
Sex X Condition			Age X Condition		
M	F		T	M	O
A 50.79	48.72		A 50.35	49.97	48.94
B 52.04	48.56		B 49.91	50.42	50.57
C 50.75	49.30		C 48.87	51.34	49.88

specific subtests could be considered equal. Likewise there was no apparent differential effect of condition upon age group; this finding indicated by the lack of significance of the age by condition interaction.

Age and condition did interact significantly with the participant - non-participant classification. Among the non-participants, the specific instructions were related to a relatively high level of performance for the young and old age groups but to a relatively low performance in the middle age group. On the other hand, among the participants, those studying under the specific instructions performed relatively better on the specific portion of the test if they were in the middle and old age groups, but relatively lower if they were in the young age group. This interaction was difficult to explain on a theoretical basis and we were inclined to conclude that this was a statistical artifact because only two of the 34 interactions were statistically significant.

The three classification variables other than age accounted for a significant portion of the variance. The men scored significantly higher than the women, the high SES group scored significantly higher than the low SES group, and the participants obtained higher means than the non-participants. These significant results were predictable from the WAIS and pretest results where these same classifications also yielded differences that were statistically significant. The significant test by sex interaction was probably related to the sex differences on the stock market pretest. The women had relatively lower means on the second testing than did the men, but the women had probably learned relatively more from the program so they would be expected to

2013

retain less because of the one-shot nature of the learning.

In summary, instructions written to direct the subject's study toward attending to learning specific terms and definitions did not facilitate performance on test items over the terms when compared with subjects studying under instructions written to direct their attention toward applications and generalizations, and subjects studying under a non-directive set of instructions. The age classification did not account for a significant portion of the variance nor did age interact with condition of study. Age and condition did interact significantly with the participation classification but the meaning of this interaction was not clear.

There was a significant drop in scores from test to retest which suggested that the subjects learned from the study. The sex, SES, and PNP classifications accounted for significant portions of the variance which was predicted on the basis of ability test and pretest scores. The order of differences on these variables were: men > women, high SES > low SES, and participants > non-participants. Sex and test interacted significantly, with the women showing a relatively greater drop from test to retest than the men.

Analysis of Understanding Subtest Results. The last twelve items of the 25 item tests over insurance, government, and stocks were written to measure the understanding and application of principles and generalizations studied in or derived from the programs. It was expected that if the study instructions had differential effects, study under Condition C would facilitate performance on these test items. The analysis of variance of the general subtest is presented in Table 19

Table 19

ANOVA of General Subtest, Experiment One

Source	df	SS	MS	F
Sex (S)	1	616.48	616.48	6.96*
SES (E)	1	1697.81	1697.81	19.19 **
PNP (P)	1	776.66	776.66	8.77 **
Age (A)	2	247.59	123.79	1.40
EP	1	285.16	285.16	3.22
EA	2	376.87	188.44	2.13
EPA	2	492.64	246.32	2.78
Error a	61	5399.66	88.52	2.78
Condition (C)	2	3.42	1.71	<1.00
SC	2	205.13	102.56	5.61 *
AC	4	268.32	67.08	3.67 *
SPC	2	85.14	42.57	2.33
PAC	4	151.06	37.77	2.06
Error b	130	2377.76	18.29	
Test (T)	1	4452.91	4452.91	376.09 **
PT	1	60.78	60.78	5.13 *
SET	1	47.71	47.71	4.03 *
Error c	69	816.67	11.84	
TC	2	33.61	16.81	<1.00
Error d	142	2769.32	19.50	
Total	431	21164.70		

with the significant means presented in Table 20. The test and re-test scores were combined into one distribution and were transformed into a distribution with a mean of 50 and standard deviation of 10.

The conditions of study had no significant effect on performance on the general understanding subtest. Also the age classification did not account for a significant portion of the variance. However, age did interact significantly with condition of study. Figure 1 is a graphic presentation of this interaction.

The graph of the same interaction on the specific subtest is included for comparison purposes. The interaction was not statistically significant on the specific subtest but it did yield an *F* ratio of 1.99.

Table 20

Significant Classification and Interaction

Means on General Items

Sex		SES					
M	F	H1	Lo				
51.25	48.86	52.04	48.07				
PNP		Test					
P	NP	T	RT				
51.40	48.71	53.27	46.84				
Sex X Condition		Age X Condition					
M	F	Y	M	O			
A 51.28	48.83	A 50.81	50.46	48.88			
B 51.97	47.93	B 48.60	52.15	49.10			
C 50.50	49.83	C 49.27	50.77	50.47			
PNP X Test		Sex X SES X Test					
P	NP	H1	M	Lo	H1	F	Lo
T 54.98	51.55	T 56.42	52.46	54.40	49.78		
RT 47.81	45.88	RT 50.38	45.74	46.95	44.31		

Other Means of Primary Interest

Condition			Age		
A	B	C	Y	M	O
50.05	49.95	50.17	49.56	51.13	49.48

On the general subtest it would appear that the older person may have benefitted relatively more from the instructions than did the other two age groups. This was supported by the specific subtest results in which the older age group showed a relatively stronger performance under Condition B, the specific instructions. The middle age group had a stronger performance on the general subtest when studying

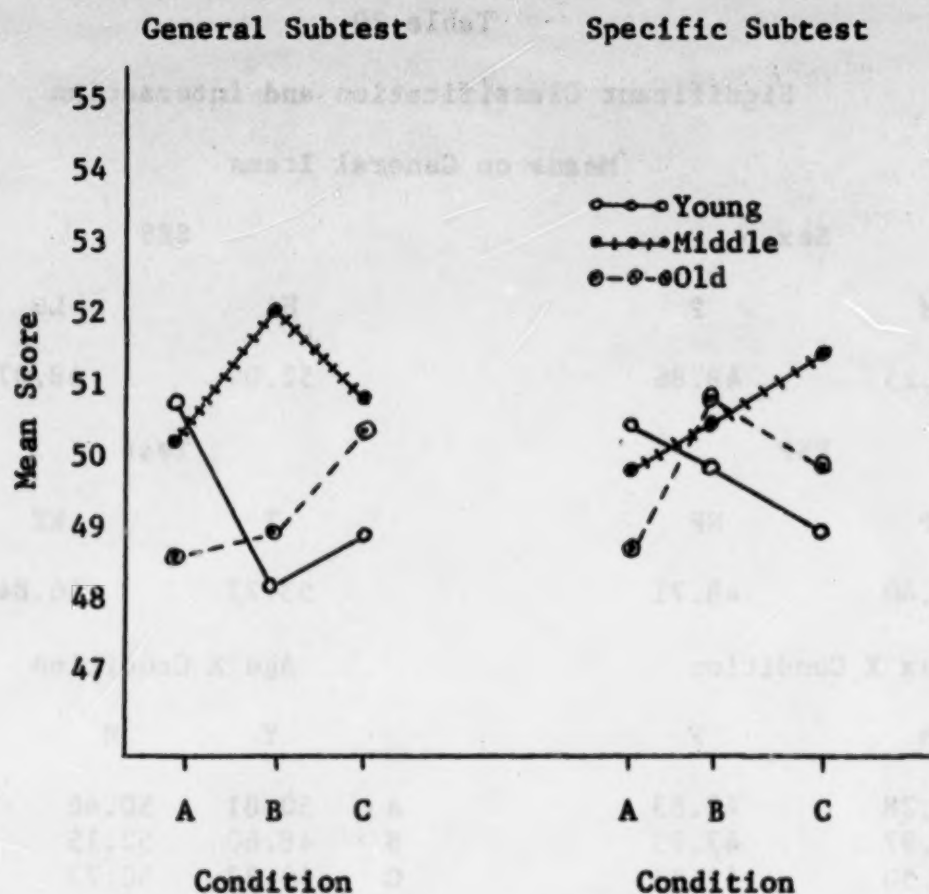


Fig. 1. Age by condition interaction on general and specific subtests.

under specific instructions and a stronger performance on the specific subtest under general instructions. The relative standing of the young group on the subtests was consistent with the conditions, i. e. specific conditions $>$ general condition on the specific subtest, and general $>$ specific on the general subtest. However, on both subtests the young group had their best performance when studying under non-directive instructions. The results for the middle age group were difficult to interpret, but the results did suggest that the younger adult might be more self directed in organizing his learning and that interfering with this self direction by study instructions might not be facilitative. On the other hand, the older adult seemed to benefit from the instructions and direction of his attention toward a certain

outcome might facilitate achievement of that outcome. This result seems in need of verification by further research because it certainly seems to have many implications for the design of effective educative activities for adults.

The significant condition by sex interaction is shown graphically in Figure 2. The specific subtest interaction is also shown although it was not statistically significant with an F ratio of 2.09. On the general subtest, the performance of the men seemed to be inhibited by instructions written to direct attention toward general applications and generalizations, and to be facilitated by the specific instructions. The women, however, performed best with the general instructions and least well with the specific instructions. In both instances, the non-directive instructions resulted in an intermediate performance. The

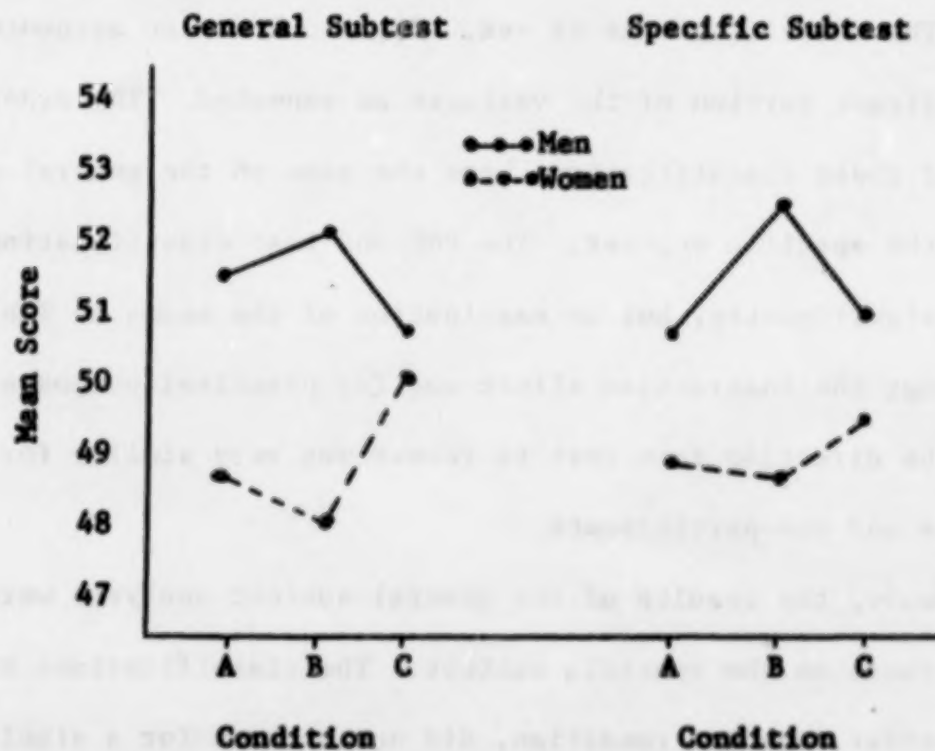


Fig. 2. Sex by condition interaction on general and specific subtests.

forms of the curves were the same on the specific subtest except that the women's performance under the specific condition was relatively higher than on the general subtest but still not as high as when studying under the general condition. These results suggested that adult men and women differ somewhat in what they attend to when in a learning situation, and that their performance is related to this difference. Perhaps men are more prone to attend to details and the learning of specifics, while perhaps women approach topics with a broader frame of reference. The results also suggested that women were more susceptible to the study conditions than the men. This interaction seems to be worthy of consideration by the adult educator and should be studied further to ascertain whether the results are replicable.

There was a significant drop in scores from test to retest as expected. The classifications of sex, SES, and PNP also accounted for a significant portion of the variance as expected. The orders of the means of these classifications were the same on the general subtest as on the specific subtest. The PNP and test classifications interacted significantly, but an examination of the means in Table 20 indicated that the interaction effect was for practical purposes quite small and the direction from test to retest was very similar for both participants and non-participants.

In summary, the results of the general subtest analysis were similar to those on the specific subtest. The classifications of primary interest, age and condition, did not account for a significant portion of the variance, but the classifications of sex, SES, PNP, and test did. Condition interacted significantly with sex and with age on the general subtest, and although the interactions were not

significant on the specific subtest, the direction of the interaction was consistent. The PNP by age by condition interaction observed on the specific subtest was similar in form to the general subtest but was not significant.

Analysis of Total Test Results. The analysis of variance for the 25 item tests, i. e. the specific and general subtest combined, is presented in Table 21 and the means of the significant effects and the interactions are presented in Table 22.

Table 21
ANOVA of Total Test in Experiment One

Source	df	SS	MS	F
Sex (S)	1	750.82	750.82	7.67 **
SES (E)	1	2269.85	2269.85	23.20 **
PNP (P)	1	811.75	811.75	8.30 **
Age (A)	2	189.73	94.86	< 1.00
EP	1	428.13	428.13	4.38
EA	2	594.82	297.41	3.04
EPA	2	456.42	228.21	2.33
Error a	61	5968.27	97.84	
Condition (C)	2	5.14	2.57	< 1.00
SC	2	176.50	88.25	7.52 **
AC	4	170.60	42.65	3.63
SPC	2	53.40	26.70	2.27
PAC	4	181.84	46.96	4.00 *
Error b	130	1526.60	11.74	
Test (T)	1	4898.50	4898.50	678.46 **
ST	1	59.27	59.27	8.21 **
PT	1	33.15	33.15	4.59 *
Error c	69	498.31	7.22	
TC	2	10.38	5.19	< 1.00
Error d	142	1634.67	11.51	

As with the subtests, the total test and retest scores for each topic were combined into one distribution and transformed into standard scores with a mean of 50 and standard deviation of 10.

The analysis of variance of the complete tests necessarily yielded results similar to the subtest analyses. The classifications

Table 22

Significant Classification and Interaction

Means on Total Test

Sex		PNP		Sex X Test	
M	F	P	NP	M	F
51.27	48.64	51.33	48.58	T 54.27	52.37
				RT 48.28	44.90

SES		Test		PNP X Test	
H1	Lo	T	RT	P	NP
52.25	47.66	53.32	46.59	T 54.97	51.68
				RT 47.68	45.49

Sex X Condition			Age X Condition		
	M	F		M	O
A	51.02	48.58	A	50.57	50.21
B	52.19	47.90	B	49.03	51.43
C	50.61	49.43	C	48.91	51.04
					48.62
					49.67
					50.12

Other Means of Primary Interest

Condition			Age		
A	B	C	Y	M	O
49.80	50.04	50.02	49.50	50.39	49.47

of test, sex, SES, and PNP accounted for a significant portion of the variance while age and condition did not. Also, those interactions that were significant in either of the subtest analyses accounted for significant portions of the variance on the total test. The significant interactions were SES by PNP, sex by test, PNP by test, sex by condition, age by condition, and PNP by age by condition.

Summary. The purpose of the first experiment was to study whether different instructions for study were related to differential performance on achievement tests administered immediately after studying

a topic and again two weeks later.

Each subject studied three topics presented in programed instruction format. The three topics were Life Insurance, Nebraska State Government, and the Stock Market. Each subject also studied under each of the three conditions with one third of the subjects studying each topic under each condition.

The three conditions for study consisted of written instructions that the subject read immediately before studying a program. Condition A instructions were non-directive and contained only comments on what the topic was and the hope that the study would be interesting. Condition B instructions were written to alert the subject to specific terms and definitions that he would be expected to know after studying the program. Condition C instructions were written to instruct the subject as to principles, generalizations, and applications that he might be expected to make or know after studying the program.

A 25 item achievement test over each topic was administered immediately after the program was studied and again two weeks later. The first 13 items of each test dealt with the meaning of specific terms and concepts covered by the program, and the last 12 items of the test were on principles, generalizations, and applications related to the material in the learning program. The two subtests were analyzed separately and the total test was also analyzed. The scores of each test and retest were combined into one distribution and transformed into standard scores with a mean of 50 and standard deviation of 10. This procedure eliminated variance due to topic mean because the means of the topics were equal. If the conditions were influential it would be expected that those who studied under the B Condition would score

better on the 13 item specific subtest than those who studied under Conditions A and C, and that those who studied under Condition C would be expected to score better on the 12 item general subtest than those studying under Conditions A and B.

The age classification was also of primary interest along with the interaction of age and condition. Neither the age nor the condition factors accounted for a significant portion of the variance in the three analyses. However, age and condition did interact significantly on the general subtest and the total test, with a non-significant tendency on the specific subtest. The interaction was such that it appeared that the older age group attended to the instructions and that their performance conformed to the predictions for the conditions. The middle age group performed highest on the general subtest when studying under Condition B (the specific condition) and highest on the specific subtest when studying under Condition C (the general condition). The young age group scored highest on both tests when studying under Condition A (the non-directive condition). The performance of the middle and old age groups on the total test was quite similar with the two directive conditions producing higher scores than the non-directive condition with the situation reversed for the young age group. This result should be validated by further experimentation because of the implications it might have for the organization of adult educative activities.

Age and condition interacted significantly with the participation classification but the meaning of the interaction was not clear. Condition and sex also interacted significantly on the general subtest and total test with a tendency shown on the specific subtest. It appeared

that the women's performance was more related to Conditions B and C than was the men's.

The classifications of test, sex, SES, and PNP all accounted for significant portions of the variance on the three analyses. There were significant drops in means from test to retest which supported the assumption that the subjects learned from studying the programs. The category means for the other classifications were ordered as follows: men > women, high SES > low SES, participants > non-participants. These differences were all predicted from similar differences obtained on the WAIS and/or on pretests over the three topics. The sex and the PNP classifications each interacted significantly with test, but the means indicated that the effect was of little practical significance.

The results of the experiment suggested that educational devices such as organizers, or set determiners might have a differential effect related to the age or sex of the adult. The experiment also supported prior studies that have consistently demonstrated an advantage in learning activities for the adult from the upper socio-economic levels and for the adult with prior experience in educative activities for adults.

Experiment Two

At the start of the second experiment, the procedure was changed so that weekly sessions were held instead of the bi-weekly sessions. This was done to facilitate the participant's scheduling and to attempt to complete the project by early summer so there would be little conflict with vacations.

The second experiment was really a correlational study rather than experimental because there was no manipulation of variables. This experiment was concerned with three questions:

1. Is there a significant relationship between attitude scale scores about a topic taken before the topic is studied and achievement test scores on the topic after the topic is studied?
2. Is the study of a topic associated with significant changes in attitude scale scores?
3. Are the attitude scores, attitude changes, and achievement test scores related to age?

This experiment was designed to examine one aspect of the concept of rigidity. If the older adult becomes more rigid, this would be reflected in two ways on the attitude scales used in this study. It would be expected that the older adult would tend toward extreme scores on the attitude scales, and that the scores of the older adults would show less change from test to retest of the attitude scale.

Procedure. Two topics were selected for this experiment: art and poetry. It was believed likely that there would be considerable variation in attitudes held toward these topics. Ten item pretests covering the material taught in the art and poetry programs were administered in the first session of the project. A Likert type attitude scale was administered in the final session of Experiment One. This scale was on attitudes toward art. In the session one week later, the subjects studied a 140 frame program on art and took a 20 item multiple choice achievement test immediately after the study. The art attitude scale was then readministered. At the next session, again one week later, the subjects were retested on the achievement test and were given a Likert type scale on poetry. The remainder of this session was devoted to testing. The 120 frame poetry program was studied in the third session and an achievement test administered. Thus, for the art portion of the

study we obtained two administrations of the attitude scale and of the achievement test. One administration of an attitude scale and of an achievement test was made in the poetry portion of the study.

Analysis of Pretest Results. The means for the total group on the 10 item poetry and art pretests were 4.58 and 4.22 respectively which indicated that there was opportunity for learning to occur from the programs. The raw scores on the pretests were transformed to standard

Table 23

Art Pretest ANOVA

Source	df	SS	MS	F
Sex (S)	1	2.79	2.79	< 1.00
SES (E)	1	73.40	73.40	8.47 **
PNP (P)	1	55.97	55.97	6.46 *
Age (A)	2	58.30	29.15	3.37
Error	18	155.94	8.66	
Total	23	346.40		

scores with a mean of 50 and standard deviation of 10. The analyses of variance of the cell means for art and poetry respectively are presented in Table 23 and 24. The method used to obtain the estimate of error variance in the two analyses was the same as that described with respect to the pretest analyses for Experiment One.

Table 24

Poetry Pretest ANOVA

Source	df	SS	MS	F
Sex (S)	1	55.45	55.45	7.40 *
SES (E)	1	90.17	90.17	12.04 **
PNP (P)	1	11.15	11.15	1.49
Age (A)	2	97.70	48.85	6.52 **
Error	18	134.74	7.49	
Total	23	389.21		

On both the art and poetry pretests a significant portion of the variance was attributable to the SES classification with the high SES mean higher than the low SES mean. On the poetry pretest the female mean was significantly higher than the male mean, and the age means were significantly different and ordered as follows: old > young > middle. On the art pretest the only factor other than SES that accounted for a significant portion of the variance was PNP. The participants' mean pretest score was significantly higher than the non-participants'. No two-way interactions were significant in either analysis.

The pretest and the WAIS analysis allowed certain expectations on the criterion test analysis. On the art test it was expected that the difference in prior knowledge and in general mental ability between the two socio-economic categories would remain. Also, we had to expect a difference between the means of the PNP categories.

The analysis of the poetry test was expected to show significance for the sex, SES, and age classifications because of the differences on the pretest and on the WAIS.

Attitude Scale Construction. The art and poetry attitude scales were constructed for the project. Copies are shown in Appendix D. Both attitude scales were constructed using the Likert technique. A try-out of the scales revealed that the art scale differentiated significantly between college students enrolled in elective art courses and college students who had not taken any elective college courses in art. The poetry scale discriminated between college students who were English majors and those who took only the basic English requirements. Reliability information about the scales is provided below in the presentation of the analysis.

Analysis of Art Results. Correlations between the art attitude scale administration, the pretest, the achievement test administration, and age are presented in Table 25.

Table 25
Correlation Matrix of Art Attitude
and Achievement Tests and Age

	1.	2.	3.	4.	5.
1. Pretest	---				
2. Achievement I	.36	---			
3. Achievement II	.33	.85	---		
4. Attitude I	.06	.04	.01	---	
5. Attitude II	-.05	-.04	-.04	.86	---
6. Age	.04	-.05	-.04	-.05	-.04

It was apparent that there was no significant relationship between the art attitude scale and prior knowledge, performances on the achievement test, or age. All of these correlations can be considered zero correlations. If the attitude scale were measuring a pertinent attitude, then the data presented in Table 23 would indicate that the attitude held about a topic such as art is not related to either knowledge about the topic or to new learning or retention of learning about the topic as measured by an achievement test given immediately after study and again one week later.

The significant and high correlation between the two administrations of the attitude scale, one administration before the study of a topic and one after the study, indicated that the study of the art program had no significant influence on the attitudes held about art. The high correlation was considered evidence as to the reliability of the attitude scale.

The low correlations between the attitude scales and age were

Table 26

Art Attitude Scale Frequency Distribution by Age Groups

Score	Young		Middle		Old	
	Pre	Post	Pre	Post	Pre	Post
95-99		1	2	2	1	
90-94	4	1	1	2	3	2
85-89	3	3	3	1	5	7
80-84	5	5	5	5	3	5
75-79	14	13	7	8	12	6
70-74	10	13	12	13	13	11
65-69	11	12	19	16	9	18
60-64	11	7	7	12	11	7
55-59	4	8	6	6	4	5
50-54	2	2	4	1	1	2
45-49	1		2	2	3	1
40-44	1	1	2	2		3
35-39			1	1	2	1
30-34			1		1	
25-29	2	2		1		
<i>N</i>	68	68	72	72	68	68
Median	70.5	70.3	67.4	67.4	70.2	68.7

Pretest Contingency Table
(Median = 69.4)

	Age		
	Y	M	O
Above Median	36	31	37
Below Median	32	41	31

Chi-Square = 2.154

Posttest Contingency Table
(Median = 68.7)

	Age		
	Y	M	O
Above Median	38	33	33
Below Median	30	39	35

Chi-Square = 1.498

taken as evidence that the older adults in the sample were not more rigid or extreme in their attitudes toward art than were younger adults. Further evidence on this point was provided by the data in Table 26 which are the frequency distributions of the three age groups in this experiment, based on two attitude scale administrations. The frequency distributions were very similar and certainly obviate any test of a hypothesis that the older adult will tend to score at the extremes on the scale.

The analysis of variance of the art attitude scale raw score cell means is presented in Table 27. Each cell had two means, test and retest, and the cells were nested within the SEPA classes.

Table 27
Art Attitude Scale ANOVA

Source	df	SS	MS	F
Sex (S)	1	378.79	378.79	16.21 **
SES (E)	1	1.35	1.35	< 1.00
PNP (P)	1	.07	.07	< 1.00
Age (A)	2	27.37	13.69	< 1.00
SE	1	137.16	137.16	5.87 *
SP	1	130.55	130.55	5.59 *
Error a	16	373.99	23.37	
Test (T)	1	.17	.17	< 1.00
ST	1	1.86	1.86	< 1.00
ET	1	.43	.43	< 1.00
PT	1	6.74	6.74	2.42
AT	2	1.41	.71	< 1.00
Error b	18	50.29	2.79	
Total	47	1110.18		

The error estimate for the classification variables was the pooled three- and four-way interactions. The error estimate for test-retest and the interactions of test with the classification variables was the pooled three-, four-, and five-way interactions involving the test factor.

The analysis was, of course, consistent with the correlational evidence in that there was no significant change in attitude scale scores from test to retest. There was a significant difference between men and women on the attitude scale with the women scoring higher than the men. However, the significant interactions of sex with SES and PNP indicated that high SES women had a higher score than the high SES man but the low SES man scored higher than the low SES woman. Regarding prior participation in adult education, the means of the men and women were also reversed regarding attitudes, with the women participants

scoring higher than the men participants, while the reverse was the case for the non-participants.

Table 28

Art Achievement Test ANOVA

Source	df	SS	MS	F
Sex (S)	1	2.09	2.09	1.17
SES (E)	1	38.59	38.59	21.56 **
PNP (P)	1	13.42	13.42	7.50 *
Age (A)	2	.25	.13	<1.00
EP	1	6.35	6.35	3.55
EA	2	10.71	5.36	2.99
Error a	15	26.90	1.79	
Test (T)	1	10.06	10.06	37.26 **
Error b	23	6.28	.27	
Total	47	114.65		

The analysis revealed a significant drop in scores from test to retest. The high SES group scored significantly higher than the low SES group, and the participants scored higher than the non-participants. The last two results were consistent with the pretest and WAIS results. Age did not account for a significant portion of the variance nor did age interact significantly with other variables on the achievement test.

Table 29

Significant Classification Means

on Art Achievement Test

SES		PNP		Test	
H1	Lo	P	NP	T	R
17.01	15.22	16.64	15.58	16.57	15.65

Summarizing the art study results: there was no apparent relationship between attitude toward art and learning about art; there was no relationship between attitude toward art and age; high SES women and women who had participated in adult education tended to have more favorable attitudes toward art than men in the same classes, but among the

low SES and non-participating groups the attitudes of the men were more favorable; there was a significant drop in achievement test scores over a week's period of time; the high SES group scored higher on the pretest and the achievement tests than the low SES group, and participants scored higher than the non-participants on the same tests.

Analysis of Poetry Results. The poetry aspect of the attitude study was included for the purpose of checking the consistency of some of the

Table 30

Pearson Product Moment Correlation Matrix of Poetry

Attitude and Knowledge Tests and Age

	1.	2.	3.
1. Pretest	---		
2. Knowledge Test	.28	---	
3. Attitude Test	.30	.09	---
4. Age	.07	-.10	.06

results across topics. The poetry attitude scale was administered once prior to the study of a poetry program and a 20 item achievement test was given immediately after the study. There was no second administration of either the attitude scale or the achievement test.

The correlations between the attitude scale, the poetry pretest, the achievement test, and age are shown in Table 30.

The attitude scale scores did correlate significantly with a measure of prior knowledge, but the attitude scale did not correlate with the achievement test covering the material studied in the program or with age. As was the case with art, attitude toward poetry did not seem to be related to the learning achieved from studying a program about poetry and the attitude did not seem to be related to the age of the person. Furthermore variations in attitude toward poetry were

Table 31
Frequency Distribution of Poetry Attitude
Scale Scores by Age Groups

95-99			2
90-94	1	3	2
85-89		2	5
80-84	3	2	3
75-79	8	7	7
70-74	7	8	2
65-69	7	5	9
60-64	9	9	9
55-59	11	5	7
50-54	2	12	5
45-49	9	8	4
40-44	3	2	4
35-39	4	4	4
30-34	1	3	3
25-29	3	1	2
20-24			
15-19		1	
<i>N</i>	68	72	68
Median	60.1	59.5	62.3

Total Contingency Table
(Median = 60.6)

	Age		
	Y	M	O
Above Median	33	34	37
Below Median	35	38	31

Chi-Square = .808

similar in the age groups. This was shown by the frequency distribution of the attitude scale scores in the age groups. The frequency distributions are presented in Table 31.

An analysis was made of the attitude scale variance. The sex classification accounted for a significant portion of the variance with women exhibiting a more favorable attitude toward poetry than men. The

analysis is presented in Table 32.

None of the other classifications or interactions yielded significant results. However, the pattern of means for the sex by SES

Table 32

Poetry Attitude Scale ANOVA

Source	df	SS	MS	F
Sex (S)	1	368.79	368.79	45.93 **
SES (E)	1	3.00	3.00	< 1.00
PNP (P)	1	5.63	5.63	< 1.00
Age (A)	2	11.79	11.79	1.47
Error	18	144.51	8.03	
Total	23	533.72		

interaction was similar to the art outcome. The women in the high SES group had higher scores than the men in the high SES group, but in the low SES group the men's mean was higher. Thus, the poetry attitude scale ANOVA yielded results very similar to the art attitude scale ANOVA.

Table 33

Poetry Achievement Test ANOVA

Source	df	SS	MS	F
Sex (S)	1	42.14	42.14	3.70
SES (E)	1	138.14	138.14	12.14 **
PNP (P)	1	113.80	113.80	10.00 **
Age (A)	2	9.33	4.67	< 1.00
SP	1	51.80	51.80	4.55 *
Error	17	191.80	11.38	
Total	23	547.01		

The analysis of the poetry achievement test variance is presented in Table 33. The means of the significant effects and interaction are shown in Table 34. The SES and PNP factors contributed significantly to the total variance with the high SES group scoring significantly higher than the low SES group, and participants higher than non-participants. The participation factor interacted with sex significantly, but an

examination of the means indicated that the difference between participants and non-participants was in the same direction within the sexes but more pronounced for the men than the women.

Table 34
Significant Classification Means
on Poetry Achievement Test

SES		PNP		Sex X PNP	
H1	Lo	P	NP	M	F
52.52	47.72	52.30	47.94	P 52.44 NP 45.15	52.15 50.74

Discussion of Attitude Study. The results of the poetry portion of the study did not directly contradict the results of the art portion, and for the most part, the results were consistent. Attitude toward poetry and art did not seem to be related to what was learned by studying programs over the topics and studying the topic did not seem to affect the attitude. Furthermore, the age of the subject was not related to either the attitude held, the achievement, or to attitude change. The consistency of attitude was similar in the age groups.

For the topics and attitudes studied, the concept of rigidity of older adults did not seem to apply. The older adults achieved as well as younger adults and did not evidence any greater tendency to be rigid in their attitudes than did adults in the other age groups.

Experiment Three

The purpose of the third experiment was to attempt to find out whether a differential interference effect could be observed by varying the subject's exposure to one topic and measuring their performance on a test over a highly related topic studied after the first topic. We

were also interested in whether any observed effects were age related.

It was necessary for this experiment that the topics studied be very similar to each other and unfamiliar to the subjects. Because of the similarity between the Greek and Russian alphabets and their unfamiliarity to the subjects, we used two 104 frame programs on basic pronunciation of some Greek and Russian letters. The Russian program was from the first part of a TMI Grolier program. The Greek program was the same, but with Greek letters substituted for the Russian letters.

Three conditions of study were used in the experiment. The subjects within cells were assigned to a condition by the same procedure used in Experiment One.

Under Condition A the subjects did not study the Greek program, but they took the 20 item multiple choice test covering Greek at one session. One week later they studied the Russian program once and took a 20 item multiple choice test over the Russian. The test was readministered one week later.

The subjects assigned to Condition B studied the Greek program once and took the Greek test. One week later they studied the Russian program and took the Russian test. The Russian test was readministered one week later.

For Condition C the subjects studied the Greek program two times, one week apart. They took the Greek test after the second session. One week later they studied the Russian program and took the Russian test. They took the test again one week later.

It was expected that if studying the Greek program had an interfering effect on learning from studying the Russian program then the means for the conditions would be ordered with $A > B > C$.

Results. Ten item completion type pretests on Russian and Greek were administered three weeks before the start of the experiment. Only a few subjects could answer any of the items on the tests. The mean score on the Greek pretest was .24. It was .06 on the Russian pretest. It appeared that the topics were quite unfamiliar to the subjects.

Table 35 contains the data from the analysis of the Greek test and in Table 36 are the means of the condition categories, the only classification to yield significance. The cell means of the raw scores on the test were the basic units for the analysis.

Table 35

Greek Test ANOVA

Source	df	SS	MS	F
Sex (S)	1	15.54	15.54	4.23
SES (E)	1	1.15	1.15	<1.00
PNP (P)	1	1.08	1.08	<1.00
Age (A)	2	7.69	3.84	<1.00
SE	1	11.27	11.27	3.07
Error a	17	62.45	3.67	
Condition (C)	2	1353.44	676.72	154.15 **
Error b	46	202.11	4.39	
Total	71	1654.73		

There was a significant difference among the conditions on the Greek test with those not having studied the Greek program scoring much

Table 36

Condition Means on Greek Test

Condition Means

A	B	C
8.30	16.87	18.02

lower than those who studied the program. The difference between the means of those who studied the Greek program once and those who studied

it twice was not large but was in the predicted direction. None of the other classifications or interactions accounted for a significant portion of the variance on the Greek test.

On the basis of the Greek test analysis, we were satisfied that the conditions for the experiment had been met. The subjects in the three conditions did study the Russian program with a differential background of knowledge in a different but highly related topic.

The 20 item Russian test contained 10 items that were written to attempt to enhance any interference effect. These items had an English word for a stem and of the four choices one was the combination of Russian letters with the English pronunciation and another was the combination of Greek letters with the sound of the English letters. The other 10 items consisted of a combination of Russian letters as the stem and the choices were English letter combinations with the sound. The 10 item subtests were analyzed separately and then the total test was analyzed. The reliability estimate of the 20 item Russian test was .71 which was the Pearson r between the scores on the two administrations.

The analysis of this experiment was influenced by an unexpected problem, a ceiling effect on the test. It was not anticipated that the program would teach such an unfamiliar topic as well as it seemed to in one session of study. This fact was apparent from means of 9.09 and 9.05 on the first administration of the 10 item subtests and means of 8.49 and 8.90 on the second administration. The total 20 item test means on test and retest thus were 18.14 and 17.39 with standard deviations of about 2.00 on each.

It was apparent that the distributions were negatively skewed and that little variance was available for analysis, but it was decided to

proceed with the analysis to ascertain if any tendencies were observable.

The analysis of the variance of the cell means on the first 10 items of the Russian test is presented in Table 37. Table 38 shows the significant means of the first 10 items. The first 10 items were the items

Table 37

Russian Test ANOVA of First 10 Items

Source	df	SS	MS	F
Sex (S)	1	5.80	5.80	3.16
SES (E)	1	.01	.01	< 1.00
PNP (P)	1	13.14	13.14	7.18 *
Age (A)	2	.52	.26	< 1.00
Error a	18	32.98	1.83	
Test (T)	1	12.78	12.78	16.38 **
Error b	23	17.88	.78	
Condition (C)	2	1.11	.56	< 1.00
Error c	46	70.31	1.53	
TC	2	1.86	.93	2.51
Error d	46	16.97	.37	
Total	143	173.36		

written in an attempt to maximize interference. The interaction terms were pooled into the appropriate error estimates according to the procedures used in previous analyses. The drop in means from test to re-test was significant and the participants' mean was significantly higher than the non-participants'. No other classifications or interactions

Table 38

Significant Classification Means and Other Means
of Interest on First 10 Items of Russian Test

PNP		Age		
P	NP	Y	H	O
9.09	8.49	8.88	8.75	8.75
Test		Condition		
T	NT	A	B	C
9.09	8.49	8.68	8.89	8.81

yielded significance, and it should be noted especially that performance on the Russian test was not related to the condition of prior study of Greek.

The analysis of the variance for the cell means on the second 10 items is presented in Table 39. Classification means of interest are presented in Table 40. The condition classification again did not

Table 39

Russian Test ANOVA of Second 10 Items

Source	df	SS	MS	F
Sex (S)	1	6.50	6.50	3.84
SES (E)	1	5.37	5.37	3.18
PNP (P)	1	5.06	5.06	2.99
Age (A)	2	2.66	1.33	< 1.00
SE	1	5.37	5.37	3.18
Error a	17	28.66	1.69	
Test (T)	1	.84	.84	2.05
Error b	23	9.39	.41	
Condition (C)	2	7.73	3.86	1.64
Error c	46	107.90	2.35	
TC	2	1.54	.77	2.08
Error d	46	17.05	.37	
Total	143	198.07		

account for a significant portion of the variance, nor did any of the other main effects. An interesting result in this analysis was that the test classification did not yield significance with only a drop of .15 points from test to retest. Apparently the items were easier than the first 10 items. The result was suggestive of further research that might be pursued. It seemed possible that the type of item might be involved, and that it might be useful to study whether test items written for language achievement differ in difficulty according to whether the stems are in English and the choices in the language or the stems in the language and the choices in English.

Three interactions were significant: sex by test, PNP by test, and SES by PNP by condition. An examination of the mean differences, revealed that the means of the interaction cells were quite similar and it did not seem desirable to attempt an interpretation.

Table 40

Classification Means of Interest on Second
10 Items of Russian Test

PNP		Age		
P	NP	Y	M	O
9.16	8.79	9.11	9.03	8.79
Test		Condition		
T	RT	A	B	C
9.05	8.90	8.68	9.24	9.01

The analysis of variance for the 20 item test cell means is contained in Table 41 and the significant classification and interaction means in Table 42.

Table 41

Russian Test ANOVA of Total Test

Source	df	SS	MS	F
Sex (S)	1	21.94	21.94	3.15
SES (E)	1	8.13	8.13	1.17
PNP (P)	1	35.85	35.85	5.14 *
Age (A)	2	4.62	2.31	<1.00
Error a	18	125.39	6.97	
Test (T)	1	18.67	18.67	25.23 **
SE	1	1.08	1.08	1.46
ET	1	1.39	1.39	1.88
PT	1	5.77	5.77	7.80
AT Error	2	4.31	2.16	2.92
Error b	18	13.25	.74	
Condition (C)	2	10.76	5.38	<1.00
Error c	46	276.63	6.01	
TC	2	4.54	2.27	2.12
Error d	46	49.32	1.07	
Total	143	581.65		

The results of the total test analysis were necessarily similar to the two subtest analyses. The condition classification was not significant, nor was the interaction of age and condition. The experiment did not, of course, negate that learning of one unfamiliar topic interferes with learning of another unfamiliar topic that is very similar to the first. In this experiment, however, the interference effect was not observed. Unfortunately a ceiling effect on the criterion tests might have served to obviate any effect that might have been observed.

Table 42

Significant Classification Means on Russian Test
and Other Means of Interest

PNP		Age		
P	NO	Y	M	O
18.34	17.34	18.00	17.92	17.59
Test		Condition		
T	RT	A	B	C
18.20	17.48	17.52	18.19	17.80

Of the other classifications, PNP accounted for a significant portion of the variance with the participants performing at a higher level than the non-participants. This finding lends further support to the previous findings that the person who has participated in educative activities seems to have an advantage over similar adults who have not. This advantage might reflect the "learning how to learn" phenomena described by Harlow (1949) and other recent investigators.

As expected there was a significant drop in means from test to retest which supported the assumption that the subjects learned from studying the program. The two other classifications sex and SES did not

yield significant differences. The lack of difference between the SES categories was interesting in view of the advantage in mental ability of the high SES group over the low group as reflected in the WAIS analysis.

The PNP by test interaction was significant, but the means indicated that both categories of participation dropped from test to retest and seemed of little practical significance.

Summary. The purpose of this experiment was to find out whether an interference effect could be observed by having subjects study an unfamiliar topic either once, twice, or not at all, and then having all subjects study another unfamiliar topic once. The second topic was very similar to the first topic. The interference effect was expected to show up on achievement tests over the second topic. The topics selected for the experiment were Greek and Russian. Programs on pronunciation of certain Greek and Russian letters were used. Pretest results indicated that both topics were unfamiliar to the subjects.

The conditions were that one group of subjects did not study Greek before studying Russian, a second group studied the Greek program once, and the third group studied the Greek program twice. These conditions did result in a significant difference among the groups on a 20 item Greek test. All subjects then studied a Russian program once and took a 20 item test immediately afterwards and again one week later. The test was in two parts with the first 10 items consisting of an English stem and of the four choices: one was the correct Russian combination of letters, another was the correct Greek combination of letters, and the remaining two choices were incorrect combinations of Greek and Russian letters. The second part of the test consisted of 10 items made up of a combination of Russian letters as the stem and the choices were

combinations of English letters with one denoting the correct pronunciation.

A ceiling effect was observed on the test, that is, the study of the program seemed to be very effective and many subjects attained perfect scores on the test and retest. Consequently, the analyses of variance were made on negatively skewed distributions of scores with little variance.

In the analyses, neither condition, age, nor the interaction of condition and age accounted for significant variance. The different conditions of studying this Greek program apparently had no effect on the performance on tests over the Russian program. Furthermore, the age groups performed equally well on the Russian tests and they showed no differential reaction to the conditions.

On the total test, there was a significant drop in scores from test to retest, but the analyses of the two subtests suggested that there was a relatively greater drop in scores on the first 10 items than the second 10 items. However, this probably reflected the fact that the first 10 items were harder rather than the result of interference acting on these items because there was not a significant interaction between test and condition on the first 10 items. The test by condition interaction should have been large if the drop in scores from test to retest on the first 10 items was related to the study of Greek.

The only other classification that accounted for a significant portion of the variance on the Russian analyses was PNP with participants scoring higher than non-participants. In view of the equivalence of these categories on the WAIS and on a pretest, this result supported the belief that participation in educative activities promotes the efficiency of later learning activities.

The lack of significance between the means of the SES categories was rather surprising when their significant difference on the WAIS was considered. Perhaps this result was further verification of the cultural relativity of mental ability tests, and that when adults from different SES levels start out even, so to speak, they can be expected to perform at the same level.

The few statistically significant interactions on the analyses did not support any useful generalizations or inferences.

Experiment Four

The fourth experiment was designed to study the effects of paced study on test performance and whether the conditions of pacing interacted with age. Three conditions of paced study were used. Condition A was a situation in which the subject proceeded at his own rate through a set of programmed materials. In Condition B the subject was slowed down by having him wait five seconds after writing his response to a frame in a program before he could see the correct response and go on to the next frame. When studying under Condition C the subject was allowed a predetermined amount of time for each frame with all subjects going through a program in the same amount of time. For most subjects, Condition C forced them to study at a faster rate than normal, but for a few the time allowed was longer than they needed.

It was decided to have all of the subjects study under each condition so the design was the same as the one described for Experiment One. Three topics were studied: Chanukah, Solar System, and Sets. The adapted programs were each about 100 frames in length, and most of the frames required short answers from the subjects. The similarity in length, the brief responses, the lack of similarity in topic, the

favorable reaction of the tryout group, and the indication from the tryout group that the material covered was relatively unfamiliar all contributed to the decision to use these programs. When these programs were tried out, the time taken by each person on each frame was recorded. The median time taken on each frame was determined. Because we wanted most of the subjects under Condition C above to have the opportunity to read and respond to each frame, we based the time allowed for each frame on the median time established by the try-out group. If the median time was under eight seconds, one second was added as the time to be allowed. Two seconds were added to the median times between 9 and 20, and four seconds were added to the frames with median times over 20 seconds. This procedure, in effect, put the time allowed for each frame at about the third quartile of the times taken by the tryout groups.

Chanukah was studied in the first session of this experiment and a 20 item multiple choice test was taken immediately after the study. In the second session a week later, the Chanukah test was readministered, the solar program was studied, and a 20 item solar test taken. The solar test was taken again at the start of the third session one week later. The sets program was then studied and a 20 item sets test taken. The sets retest was administered in a session one week later. As indicated previously the group was divided into thirds so that each topic was studied under each of the conditions. The groups changed to a different condition for each topic. Thus, every subject studied every topic once and studied once under every condition.

The procedures used in the sessions for this experiment were necessarily somewhat different from those used in the other three because of the conditions. Conditions B and C were such that it was necessary that

the programs be manipulated by some person or device other than the subject. It was decided to have another person manipulate the programs for the subject and do the necessary timing. Sixteen graduate students were hired and trained to administer the programs and the session schedule was rearranged so that each subject studied the program in an individual session with one of the administrators manipulating the program according to the appropriate condition of study.

The frames of the programs were printed on individual cards with the correct response printed on the back of the card. When a subject came for a session he was met by his administrator for that session (usually the same person for the three sessions) and they sat across from each other at a table. The administrator described the procedures for the session to the subject and proceeded to administer the program. The administrator timed the five second delay in Condition B by running a stop watch for five seconds when he observed that the subject had finished writing his response. In Condition C each frame was timed with a stop watch by the administrator. Condition A was also administered individually although each subject went at his own rate.

Table 43

Mean Times in Minutes, Standard Deviations, and Interquartile

Ranges on Condition C by Topic

	<i>M</i>	<i>SD</i>	<i>Q</i>
Chanukah	38.80	2.23	3.08
Solar	34.42	2.19	3.04
Sets	40.77	2.78	3.73

It was recognized that administrator variance was a source of error in the consistency of the conditions. One check on this variance was

provided from Condition C. In all of the conditions, the time taken was recorded by the administrator to the nearest minute. If the administrators had been error free in the administration, the times for Condition C for a program should have all been the same. Table 43 contains the means and standard deviations for the Condition C administration by program.

Although there was some error, we were satisfied that the conditions had been invoked, and that we had established situations in which the subjects went at their own rate, were slowed down, and were forced to go at a rate that was the same for all.

That the conditions had an influence on the time taken for study was substantiated by the data in Table 44 and Table 45.

Table 44

Study Time ANOVA, Experiment Four

Source	df	SS	MS	F
Sex (S)	1	72.05	72.05	1.81
SES (E)	1	1090.58	1090.58	27.34 **
PNP (P)	1	230.12	230.12	5.77 *
Age (A)	2	725.32	362.66	9.09 **
Error a	66	2632.74	339.89	
Condition (C)	2	5642.68	2821.34	197.16 **
SC	2	88.12	44.06	3.08
EC	2	365.28	182.64	12.76 **
PC	2	184.42	92.21	6.44 *
AC	4	337.77	84.44	5.90 **
Error b	132	1888.61	14.31	
Total	215	13257.69		

The times taken for each topic were transformed into a distribution with a mean of 50 and standard deviation of 10. The analysis was made using the cell average as the basic datum with three scores for each of 72 cells or 216 total cell averages.

The highly significant *F* value for condition indicated that there

was a significant difference among the condition mean times. When studying under the C condition (constant rate) the mean time taken was lower than when under the A condition (own rate). Likewise, when studying under the A condition the mean time was lower than for the B condition (delay after each frame).

Table 45

Significant Classification Mean Condition Time
and Interaction Means for EC, PC, and AC

Condition			SES by Condition			
A	B	C		H1	Lo	
50.86	55.88	43.43	A	47.52	54.20	
			B	52.89	58.86	
			C	43.02	43.85	
PNP by Condition			Age by Condition			
	P	NP		Y	H	O
A	48.65	53.08	A	47.78	49.89	54.92
B	54.96	56.80	B	53.09	55.59	58.95
C	43.47	43.39	C	43.32	43.40	43.59

Three other classifications, SES, PNP, and age, and the three interactions of the classes with condition yielded significance. The interactions are presented graphically in Figure 3 and show the nature of the differences more clearly than classification means.

Condition C produced nearly equal means in the categories of all three classification which was necessarily so because of the definition of the condition. The category means for Conditions A and B were quite different however in the classifications. Under both Conditions A and B the low SES group took significantly more time than the high SES group. Likewise the participants took significantly less time than the non-participants in both conditions. The means for the age categories

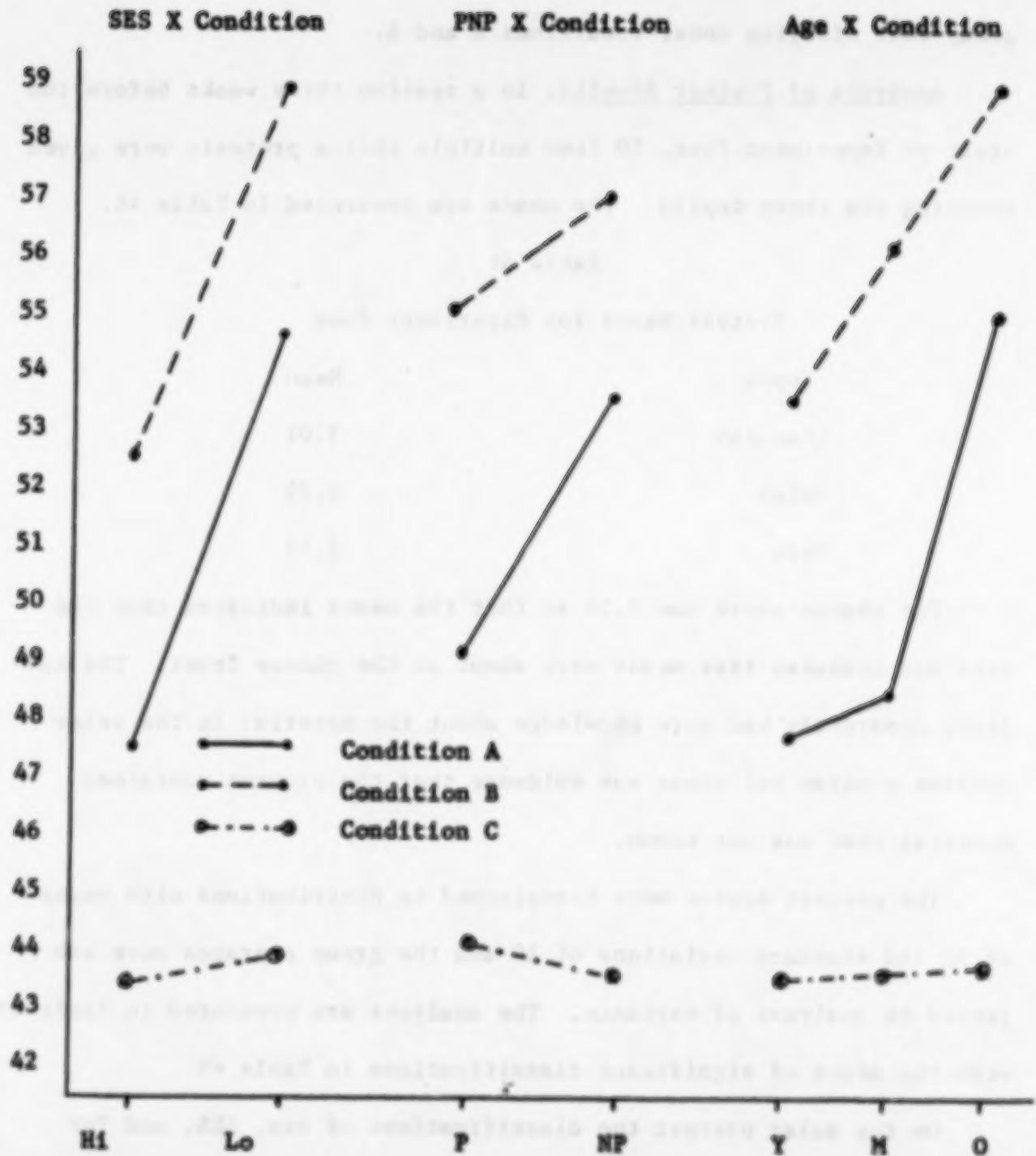


Fig. 3. Significant interactions of condition with SES, PNP, and age on time taken in Experiment Four.

on Conditions A and B supported findings from other studies that the time taken for study by adults is positively related with their age. In this sample the older subjects took significantly more time than the middle age group which in turn took significantly more time than the young age

group when studying under Conditions A and B.

Analysis of Pretest Results. In a session three weeks before the start of Experiment Four, 10 item multiple choice pretests were given covering the three topics. The means are presented in Table 46.

Table 46

Pretest Means for Experiment Four

Topic	Mean
Chanukah	3.01
Solar	5.71
Sets	2.49

The chance score was 2.50 so that the means indicated that the sets and Chanukah test means were about at the chance level. The subjects apparently had more knowledge about the material in the solar systems program but there was evidence that the program contained material that was not known.

The pretest scores were transformed to distributions with means of 50 and standard deviations of 10 and the group averages were subjected to analyses of variance. The analyses are presented in Table 47 with the means of significant classifications in Table 48.

On the solar pretest the classifications of sex, SES, and PNP accounted for a significant portion of the variance of the category means and were ordered as follows: men > women; high SES > low SES; participants > non-participants.

The sets analysis resulted in a significant difference between the SES category means with the high SES group scoring higher than the low SES group. However, the fact that the scores on this test seemed to be at a chance level suggested that this result might be a chance effect.

Table 47

ANOVA of Experiment Four Pretests

Source	df	SS	MS	F
Solar				
Sex (S)	1	232.94	232.94	22.81 **
SES (E)	1	71.24	71.24	6.98 *
PNP (P)	1	61.34	61.34	6.01 *
Age (A)	2	1.00	.50	< 1.00
Error	18	183.83	10.21	
Total	23	550.35		
Sets				
S	1	7.62	7.62	< 1.00
E	1	47.43	47.43	4.61 *
P	1	.04	.04	< 1.00
A	2	9.24	4.62	< 1.00
Error	18	185.01	10.28	
Total	23	249.34		
Chanukah				
S	1	.09	.09	< 1.00
E	1	224.05	224.05	23.71 **
P	1	45.40	45.40	4.80 *
A	2	31.81	15.90	1.68
Error	18	170.08	9.45	
Total	23	471.43		

The fact that the SES classification had consistently yielded significant differences on the pretests of the study did suggest, however, that

Table 48

Significant Classification Means on Pretests for Experiment Four

Topic	Sex		SES		PNP	
	M	F	Hi	Lo	P	NP
Solar	52.80	46.57	51.41	47.96	51.29	48.09
Sets			51.68	48.87		
Chanukah			53.02	46.91	51.34	48.59

if any classification would account for variance on this pretest it would be SES.

The SES category means did differ at a very significant level on the Chanukah pretest and this was the only classification to yield significance. No interactions were significant in the pretest analyses.

From the pretest results and the results of the WAIS analysis, it was expected that the SES classification would account for a significant portion of the variance on the criterion tests and that any difference in the sex and PNP means might be explained in part by the different levels of prior knowledge by persons in the different categories of these classifications on the solar pretest.

Analysis of Criterion Measures. The scores for the 20 item multiple choice test and retest for each topic were transformed into one standard score distribution with a mean of 50 and standard deviation of 10, thus eliminating variance due to topic in the analysis. An estimate of the

Table 49
Experiment Four ANOVA

Source	df	SS	MS	F
Sex (S)	1	59.20	59.20	< 1.00
SES (E)	1	1538.01	1538.01	16.31 **
PNP (P)	1	990.63	990.63	10.51 **
Age (A)	2	289.52	144.76	1.54
Error a	66	6223.09	94.29	
Test (T)	1	491.65	491.65	83.90 **
ET	1	13.79	13.79	2.35
SET	1	17.45	17.45	2.98
SPT	1	17.31	17.31	2.95
SAT	2	34.74	17.37	2.96
EPT	1	33.60	33.60	5.73 *
Error b	65	380.95	5.86	
Condition (C)	2	726.62	363.31	14.47 **
Error c	142	3563.62	25.10	
TC	2	11.68	5.84	< 1.00
Error d	142	1274.15	8.97	
Total	431	15666.01		

reliability of the 20 item tests was available from a Pearson r computed between the test and retest scores. The correlations were .80 for Chanhukah, .75 for solar system, and .70 for sets.

The significant results of the analysis of variance for this experiment are presented in Table 49 with the means in Table 50.

Table 50

Significant Classification and Interaction Means

on Experiment Four

SES		PNP		
H1	Lo	P	NP	
51.82	48.04	51.44	48.42	
Test		Condition		
T	RT	A	B	C
51.00	48.86	51.28	50.33	48.18

SES X PNP X Test

H1		Lo	
P	NP	P	NP
T 53.87	51.54	50.97	47.60
RT 51.71	50.14	49.21	44.38

Other Means of Primary Interest

Age			Age X Condition		
Y	M	O	Y	M	O
50.60	50.41	48.78	A 52.19	51.68	49.97
			B 50.67	50.77	49.55
			C 48.94	48.79	46.81

The conditions did account for a significant portion of the variance.

Both of the timed conditions apparently depressed the performance from

the condition in which the subject proceeded at his own rate. Of the two

timed conditions, the condition in which all subjects were forced to go at the same rate resulted in lower scores than when the subject could respond at his own rate but was forced to wait a brief time between frames. These results suggested that, at least for programmed instruction, the adult learned most effectively when allowed to proceed at his own rate, and that pacing by either speeding up or slowing down served to inhibit optimum performance. The conditions did not interact significantly with any of the other classifications. We expected condition to interact with age, but the effect of the conditions was consistent across the age categories. The effect of the imposed conditions was apparently consistent and pervasive for all classifications.

The means for the age categories were apparently equal; a result consistent with the other experiments in the project. There was a significant drop in scores from test to retest as expected. The drop suggested that immediate learning occurred from the study of the programs.

The SES and PNP classifications accounted for significant portions of the variance with the category means in the expected orders of high SES > low SES, and participants > non-participants. The significance of the SES classification could be explained in large part by the significant results in the same order on the three pretests and on the WAIS. The participants did score significantly higher than the non-participants on the solar pretest, and the result on the criterion tests might be partly attributable to this. The result did suggest, however, further support for the previously found advantage in educative activities for those with recent prior experience in an educative activity.

Only one interaction, SES by PNP by test, was significant. This significant result could be attributable to chance. An examination of

the means for this interaction revealed little of practical significance with the low SES non-participants showing a slightly greater drop in test-retest means than the other groups.

Summary. This experiment was designed to study the effect of different conditions of pacing on test scores covering material studied under the several conditions. The interaction of the paced conditions with age was also of primary interest.

Three programs of approximately 100 frames each were used in the study. The programs were on the topics of Chanukah, Solar Systems, and Set Theory. Three conditions of study were invoked: Condition A allowed the subject to study at his own rate; in Condition B the subject studied at his own rate but was forced to wait five seconds after writing his response before going on; and Condition C forced all subjects to go at the same rate by allowing them only a predetermined amount of time per frame. The time allowed per frame was determined on the basis of the performance of a tryout group. The subjects made written responses to each frame in all conditions with the exception of Condition C in which the timed situation prevented a complete written response to some frames for the slower persons.

Each of the 208 subjects studied each topic and studied under each condition. A 20 item multiple choice test was administered immediately after a program was studied and again one week later at the start of the next session.

An analysis of the variance of the time taken with each program was made. The condition classification did account for a significant portion of the variance with Condition B taking more time than Condition A which in turn had a higher mean than Condition C. The

classifications of SES, FHP, and age also were significant with the category time means ordered as follows: high SES < low SES; participants < non-participants; young < middle < old.

The analysis of the achievement test scores revealed a significant difference among the conditions. The condition of study allowing the subject to proceed at his own rate had the highest achievement test mean, with the delayed condition next, and the condition with the constant time having the lowest mean. It would appear that pacing should be used with caution because an imposed pacing is likely to inhibit performance. The condition effect was apparently consistent across the other classifications as condition did not interact significantly with any other classification.

There was a significant drop in scores from test to retest as expected. Also, 10 items in the criterion test had been administered three weeks prior to the experiment as a pretest. A *t* test for each condition within topic revealed significantly higher means on the test and retest than on the pretest for the three conditions within each of the topics. The means for the conditions within each of the topics were consistent with the difference among conditions obtained in the main analysis. These results indicated that the subjects learned a significant amount from the study of the program.

The high SES group had a significantly higher mean than the low SES group. This result was predictable on the basis of more prior knowledge and higher ability of the high SES group. The high SES group scored significantly higher on each of the pretests and on the WAIS.

The participants' mean was significantly higher than the non-participants'. This result might be attributable in part to more prior

knowledge by the participants regarding the solar system test. The result did, however, provide further evidence that the person with prior experience in adult educative activities can be expected to perform at a higher level than the non-participant. The advantage of the participants was not due to superior mental ability. It could be that the participant has a larger fund of prior knowledge and it could also be that the participant has learned an effective strategy for success in educative activities.

The age and sex classifications did not account for a significant portion of the variance. One interaction was significant, SES by PNP by test, but this might well have been a chance result because some 40 interactions were obtained and by chance two of these should have been significant at the .05 level.

Other Results

In addition to the WAIS, all subjects took three other standardized instruments; the Fee Inventory of Values, the 48 Item Counselor Evaluation Test, and the Strong Vocational Interest Blank. The tests were administered to find out whether performance on the criterion instruments of the four experiments was related to the variables measured by the above tests. The correlations between the variables were computed separately for the sexes because the Strong scales are not the same for the sexes.

The fact that mental ability was related in a moderate way to the performances on the criterion instruments was indicated by the data in Table 31. The verbal scales in general tended to be related to the test performances to a greater degree than the performance scales. There was a consistently higher relationship between the WAIS scale scores and

Table 51

Pearson r 's Between WAIS Scales and the First Administration
of each Criterion Instrument by Sex^a

		Go	Ins	St	Art	Po	Gr	Ru	Ch	So	Se	Art Att	Po Att
Info.	M	39	42	43	47	45	19	36	33	41	46	14	14
	F	62	53	57	51	57	13	52	51	52	53	09	31
Comp.	M	37	37	37	37	36	19	25	29	32	32	12	06
	F	53	48	52	45	48	11	44	45	47	51	16	23
Anith.	M	47	50	57	44	42	14	39	33	36	51	-08	-11
	F	55	49	53	32	35	09	42	31	33	45	01	14
Sim.	M	42	52	38	35	43	23	37	41	34	33	09	09
	F	46	56	54	53	47	09	41	42	50	51	20	29
Dig. Sp.	M	06	27	27	22	25	19	20	16	25	28	-05	-04
	F	41	34	28	25	36	23	34	32	33	37	-05	-01
Vocab.	M	41	49	48	53	44	21	36	30	43	42	-02	-02
	F	54	51	55	52	43	10	41	41	40	46	-07	23
Dig. Sym.	M	12	24	18	26	23	13	21	27	20	28	02	-03
	F	33	36	37	36	32	05	36	33	33	41	03	-03
Pic Comp.	M	24	45	41	41	40	28	33	29	30	43	-03	-09
	F	49	45	40	45	32	03	43	23	45	42	-01	12
Block Design	M	31	39	35	43	32	17	43	30	30	45	03	-19
	F	37	41	36	34	24	16	31	32	33	35	17	15
Pic. Arr.	M	28	44	37	40	48	26	34	33	32	41	06	-08
	F	32	36	31	32	24	16	33	27	31	47	11	-08
Obj. Assem.	M	08	25	18	31	30	28	43	28	26	29	02	-12
	F	16	15	14	18	09	04	13	13	21	16	-05	05
Verbal	M	44	54	51	49	48	23	40	37	43	49	04	06
	F	70	65	69	60	60	15	56	54	57	64	10	30
Perf.	M	26	44	37	45	43	28	45	37	35	47	02	-13
	F	50	52	48	50	36	13	46	39	49	54	07	06
Full	M	40	55	50	53	51	28	46	41	44	54	03	-03
	F	69	67	67	62	56	16	59	54	61	67	10	22

Note.-- Go = Government; Ins = Insurance; St = Stocks; Po = Poetry;
Gr = Greek; Ru = Russian; Ch = Chanukah; So = Solar; Se = Sets; Po Att =
Poetry Attitude.

^aSignificant r 's are .19 and .25 for .05 and .01 levels, respectively.
All decimal points omitted.

criterion test performance for the women than for the men and the evidence would indicate that mental ability is a better predictor of achievement for adult women than for adult men. The relationship between the art and poetry attitude scales and the WAIS scales was quite low although there was some indication of a tendency for women with higher verbal ability to have a more favorable attitude toward poetry.

Table 32

Significant Pearson r 's Between PIV Scales and First
Administration of Criterion Instruments by Sex^a

		Go	Ins	St	Art	Po	Gr	Ru	Ch	So	Se	Art Att	Po Att
Aesthetic	M											60	46
	F				22	-23						38	34
Intel- lectual	M									24		20	28
	F		-20									33	33
Material	M												
	F				-19	-24		-23		-26			
Power	M					24						26	
	F			25		20							
Social Contact	M											33	
	F												
Reli- gious	M	-19	-43	-34	-28	-22		-23			-22		
	F												
Prestige	M											26	
	F							-22				21	
Human- itarian	M	-21	-31	-24							-22	19	26
	F												

Note.-- Go = Government; Ins = Insurance; St = Stocks; Po = Poetry; Gr = Greek; Ru = Russian; Ch = Chanukah; So = Solar; Se = Sets; Po Att = Poetry Attitude.

^aDecimal points omitted.

The relationships by sex between the scales on the PIV and performances on the criterion instruments are shown in Table 32.

It was apparent from the data in Table 32 that there were no strong relationships between the scores on the value scales and the criterion instruments. Two rather consistent relationships were that men with high scores on the religious and humanitarian value scales had a slight tendency to score low on the criterion tests, and the same relationship was displayed by the women on the material values scale. The correlations were statistically significant, but probably of limited predictive significance.

Table 33

Significant Pearson r 's Between 48 ICHT Scales and First
Administration of Criterion Instruments for Women^a

	Co	Ins	St	Art	Po	Gr	Ru	Ch	So	Se	Art Att	Po Att
Anxiety	-.24	-.24	-.30	-.28	-.26	-.17	-.19	-.28	-.22	-.21		
Compulsive			-.27		-.32	-.28		-.22	-.23	-.21		
Depression												
Friendship						-.21						
Religious												
Goals		-.23			-.27		-.23	-.20	-.19	-.19	.19	
Inadequacy			-.26					-.23				
Total Score	-.16	-.22	-.30	-.22	-.30	-.22	-.18	-.26	-.23	-.20		

Note.— Co = Government; Ins = Insurance; St = Stocks; Po = Poetry;
Gr = Greek; Ru = Russian; Ch = Chanukah; So = Solar; Se = Sets; Po Att =
Poetry Attitude.

^aDecimal points omitted.

The art and poetry attitude scales had moderately strong correlations with the aesthetic value scale. This result might be interpreted as evidence for concurrent validity of the attitude scales because they would be expected to have some communality with a construct such as aesthetic value.

The significant correlations between the 48 ICHT scales and the criterion instruments are shown in Table 33.

Table 34

Significant Correlations Between SVIB Scale Scores
and Criterion Instruments for Women^a

	Go	Ins	St	Art	Po	Gr	Ru	Ch	So	Se	Art Att	Po Att
Artist				19								
Author	24		21	29	21		25	26				33
Librarian	23			21			23		20	19		
English												
Teacher	35	30	33	42	37		32	42	23	29		43
Soc. Wkr.	26	25	38	34	40			38	29	22		39
Psychol.	31	26	42	40	37			36	38	27		39
Lawyer	31	33	42	29	35			33	29	19		38
Soc. Sci.												
Teacher	37	33	37	32	36		20	37	38	30		25
YWCA Sec.			25		23				26			34
Life Ins.												
Sales			24									21
Buyer				-28	-24		-21	-24	-36	-31		-31
Housewife	-20		-23	-30	-24			-22	-21			-32
Ele. Tchr.												
Off. Wrkr.	-21	-27	-34	-33				20	-30			-45
Secretary									-26			-34
Bus. Ed.												
Teacher												36
Home Ec.												
Teacher												27
Dietitian	-25		-23	-33	-28		-21	-29	-26	-20		-39
Phys. Ed.												
Teacher												20
Occ.												
Therapist												
Nurse	-24	-24	-24	-28			-21					
Math Sci.												
Teacher												-27
Dentist	-23	-26	-26	-27	-20			-28				
Lab. Tech.	-24	-20	-25	-28	-24			-27				-30
Physician									22			
Mus. Tchr.				26	20			23				25
Musician				26	21			22				34
Phys.												
Therapist	-23	-20										
Engineer												
M-F				28	19			28				27

Note.— Go = Government; Ins = Insurance; St = Stocks; Po = Poetry;
Gr = Greek; Ru = Russian; Ch = Chanukah; So = Solar; Se = Sets; Po Att =
Poetry Attitude.

^aAll decimal points omitted.

Table 55
Significant Correlations Between SVIS Scale Scores
and Criterion Instruments for Men^a

	Co	Ins	St	Art	Po	Gr	Ru	Ch	So	Se	Art Att	Po Att
Artist												
Psychologist	20	27	25	41	33	25	31		43	26		22
Architect						22	22					
Physician				33	20	21	20		31			
Osteopath												
Dentist			-21									
Veterinarian		-23	-31		-36	-20	-25	-25	-28	-22	-25	
Mathematician				34		25	30		26	34		
Physicist				29		22	29		23	27		
Engineer						20	26				21	
Chemist				28		20	27		22			
Production Manager												
Farmer			-25		-30				-23		-39	-25
Aviator											-24	
Carpenter	-23	-29	-33	-24	-37			-26	-26	-22		
Printer			-22									
Math. Phys.												
Sci. Tchr.						20						
Ind. Arts Teacher			-23		-26							
Voc. Tchr.			-23		-32			-20			-27	
Policeman	-24	-24	-28	-32	-28				-27	-37		
Forest Service Man												
YMCA Phy. Director											28	29
Pers. Dir.			28		22			20			31	29
Pub. Adm.	21	30	32	22	29			22	29		21	26
YMCA Secy.											29	30
H.S. Sec.												
Sci. Tchr.											28	24
School Supt.		23	26	24	24			21	30		23	25
Soc. Wkr.					22				27		37	34
Minister									31		34	34
Musician				23		26	21		29		24	19
C.P.A.	23	26	32	26	35		24		28			
Senior C.P.A.		21										
Accountant												

(Table continued on next page)

Table 55 Continued

	Go	Ins	St	Art	Po	Gr	Ru	Ch	So	Se	Art Att	Po Att
Office Man				-21					-20			
Purchasing Agent									-32			-24
Banker				-28	-26	-22	-27		-35			
Hortician	-31	-22	-37	-30	-25	-33			-38	-27		
Pharmacist	-27			-21	-22	-24			-33			
Sales Mgr.					-19							
Real Est.												
Salesman				-25	-21	-27	-27		-31	-20		
Life Ins.												
Salesman							-26				26	
Adv. Man											31	
Lawyer	21	23	23	26	31				26	19		
Author-												
Jrnlst									20			
President												
Mfg. Concern												
Specialis.												
Level		30	36	30	32		24		36	20	24	25
Occ. Level	29	34	41	32	38			29	26	30		
M-F											-43	-29

Note.-- Go = Government; Ins = Insurance; St = Stocks; Po = Poetry; Gr = Greek; Ru = Russian; Ch = Chanukah; So = Solar; Se = Sate; Po Att = Poetry Attitude.

Decimal points omitted.

Only the correlations for the women were included in the table because there was only one statistically significant correlation out of the 84 for the men.

The distributions of scores on the ICHT scales were very positively skewed with many zero scores especially for the men. This probably explains in part the very low correlations obtained for the men. The lack of normality in the 48 ICHT scales makes any discussion of the correlations very tentative. The pattern of the correlations for the women was interesting, however, in that a very consistent tendency was noted for the women who scored high on the anxiety, compulsive, religious goals, and total scales to score low on the criterion tests.

The correlations between the Strong scales and the criterion scale scores of the women are in Table 54 and the correlations based on the men's scores are in Table 55.

The correlations in Tables 54 and 55 indicated a rather consistent pattern that was similar for both men and women. The subjects who scored high on the vocational scales that would be logically associated with intellectual and verbal activity tended to score high on the achievement tests. The subjects, however, who scored high on vocational scales associated with physical and clerical activities tended to score low on the achievement tests. The data on these standardized instruments should provide a base for some interesting follow-up research of the sample.

CHAPTER IV

DISCUSSION

The data from the four experiments reported offer some interesting and important implications for adult educators. In the first part of this chapter, results that seemed to show a consistency across the experiments, are discussed, and later in the chapter specific implications from each experiment are explored.

The most consistent result across the experiments was the lack of apparent relationship between the age of the subject and performance on any of the criterion measures. Age served as a classification in each analysis of criterion measures. There were three age categories in the classification: under 31, 31-44, and 45-65. This classification did not account for a significant portion of the variance in any of the criterion analyses. The evidence from these experiments was consistent with other research comparing the performance of adults of different ages (cf. Birren, 1963; Knox and Sjogren, 1965) and in some respects provided more compelling evidence than the Knox and Sjogren study, that the older adult is not necessarily handicapped when competing with a young adult in a learning situation. In the Knox and Sjogren study a multiple regression approach was used for identifying variables that contributed significantly toward predicting a level of performance by adults in evening college classes. Age was included as a variable and the partial correlation of age with the criterion was not significantly different from a zero partial. Of the other variables, however, at least two or three were age related (years of formal education, vocabulary level, SES) so that even though age itself was not directly

related to the criterion certain age related variables were related to the criterion. In the present experiments, the sample selection procedures were such that SES and mental ability were constant across the age groups. That is, there was an equal number of high and low SES subjects in each age group and the mental ability, as measured by the WAIS, was equal among the age groups. In such a situation, age, if related to performance, should have accounted for a significant portion of the criterion test variance, but it did not. One more bit of evidence is hereby presented to dispel the stereotype of the adult becoming a less effective learner with advancement in age.

Another result that was pervasive through the experiments was the apparent facilitative effect on performance of previous participation in adult educative activities. The participation - non-participation classification accounted for a significant portion of the variance on all of the achievement test analyses. In some of the experiments the pretest scores indicated greater prior knowledge of the topic by the participants, but not in every case. The mental ability test means of the two categories did not differ significantly.

It might be that the person who participates in adult education activities develops a greater fund of information than the non-participant and that this serves to facilitate the participant's performance. On the other hand, the fact that the performances of the two groups differed even in situations in which the level of prior knowledge could be considered equal suggested that the participant had an advantage over the non-participant in terms of being a more efficient and effective learner. In other words, the participant may have achieved a higher level of something akin to the "learning how to learn" referred to by

Harlow (1949). The results of this study supported the finding of Sorenson (1930), and whatever the reasons for the apparent advantage in a learning situation for the previous participant, the adult educator is well-advised to recognize the advantage and attempt to provide for it.

The SES classification accounted for a significant portion of the variation on all but one of the achievement tests. This was expected in view of the differences exhibited between the high and low SES groups on the mental ability test and the pretests. The one test in which no difference resulted was Russian; a topic with which neither SES group was familiar prior to the study.

The sex classification did not yield consistent results across the experiments, but the test classification yielded a significant drop in scores from test to retest in all but one of the analyses. This was interpreted as evidence that learning occurred from the study of the materials. One other comment should be made with reference to the test-retest classification. This is that test did not interact significantly with age in any of the analyses. Not only did the age groups perform equally on the tests, but the retention of the age groups was apparently equal.

The data from the mental ability tests supported previous research (cf. Birren, 1963) in which the level of performance on information, comprehension, and verbal items tended to increase steadily with age, and the level of performance on perceptual and timed items tended to decrease with age.

Certain implications are suggested by each of the studies. Brief paragraphs written to direct the attention of the subject to certain aspects of the material had no apparent overall effect on the performance

of the subjects. This result was at variance with other research using similar conditions of study. An interaction effect was observed between the condition of study and the sex and age of the person. The performance of the older adults in our sample was somewhat more affected by the instructions than the young or middle age adults. The young adults performed better when their attention was not directed toward specific material. This interaction should be explored further and if verified by further research indicates that the organization of adult educational activities should differ depending upon the age of the participants. The older adult might make good use of organizing cues and attention directing types of materials early in a course, while the young adult might be inhibited in his performance by this kind of material and do better in a less structured type of class situation.

The men in our sample exhibited a tendency to attend to detail and specific bits of information in their study and performed at their highest level on either specific or general test items when their attention was directed toward specifics in the program. The women, however, seemed to benefit more from instructions that directed their attention to generalizations and applications. This condition resulted in the highest level of performance on both the general and the specific items for women. The result is interesting and in need of verification by further research, because, if true, it also suggests some provisions that the adult educator might make in organizing educational activities.

There was no evidence of increased rigidity with age. If anything the direction of the interaction of the study conditions with age mentioned above suggested that the older adult is less rigid if receptibility to instructions is an aspect of rigidity. The measured attitudes

toward art and poetry revealed no differences among the age groups, and some of the age groups exhibited greater change on a readministration of the art attitude scale.

The experiment in which we attempted to establish an interference effect was inconclusive. No interference effect was observed on the study of Russian by the study of Greek. The subjects learned from the study, perhaps too well for our purposes because a ceiling effect on the criterion measure was observed that might have obscured any interference effect.

The results of the last experiment conducted provided some rather definite indications that pacing has a depressing effect on performance when studying programmed materials. Either "speeding-up" or "slowing-down" an individual served to inhibit performance, but the effect was greater when the subject was forced to go at a faster rate than normal. The oft-quoted principle of learning that learning is most effective when the individual proceeds at his own rate was provided further support by this study.

It was interesting that the condition of paced study did not interact with age. When allowed to go at their own rate, there was a positive relationship between time taken and the age of the person, a result consistent with the ability studies cited previously. Consequently, we expected that the paced conditions would interact with age with the slowed condition affecting the younger person's performance adversely, and the speeded condition having a similar effect on the older person. The condition effect was consistent across the age groups, however. The lack of a greater effect of the speeded condition on the older subject suggested that the older person might perform more slowly than necessary.

Perhaps the older adult sacrifices speed by an overemphasis on accuracy which lowers his efficiency without increasing his effectiveness in a learning task. However, the speed up should not be as great as was imposed in this experiment.

Limitations of the Study

The experiments raised more questions than they answered, but we consider this a desirable outcome. The generalizability of the results is limited by the following points.

1. The sample was not drawn randomly from a population of adults. The samples within the cells formed by the classification categories could reasonably be considered representative of an urban population of like persons in this area of the country. The point is that generalization to the total adult population is not justified. There is no evidence of a serious bias, however, in terms of individuals from certain vocational, educational, social, or ethnic backgrounds so that it seems reasonable that one need not be overly cautious in generalizing.

2. The study materials were all programmed materials studied individually. Thus, generalizations to other types of educational activities should be made with caution. Perhaps it is appropriate to mention here that the reaction of this sample of adults to programmed materials was generally favorable. (See Appendix E for a copy of the final questionnaire.) When asked to state their preference for eight methods of studying topics, the use of programmed materials was selected as the first, second, or third choice less often than receiving individual instruction from an expert or working directly with the materials. Programmed materials received more first, second, or third choices than viewing educational television, listening to a lecture, participating in a discussion group, reading books or articles, and participating in a

field trip.

3. The subjects were pretested on all topics. The pretest should be considered part of the condition so that the results are generalizable only to pretested groups of adults.

4. The level of reliability of the criterion instruments and the quality of the programs may have been such that any effects were obviated by errors in the criterion measures or by ineffective programs.

5. The programs, topics, and conditions were all fixed effects and not random samples of larger populations. Thus, the results are not generalizable to all programs, topics, or like conditions.

6. The payment to the subjects for participation had an indeterminate effect on the motivation of the subjects. It seems reasonable to assume the completion rate would have been lower if there had been no payment, and there is no way of ascertaining whether the financial aspect had any effect on the performance of the subjects in their study.

We mentioned earlier in this chapter that the results of the experiments raised more questions than were answered. The level of educational research today is such that this is a desirable outcome. The identification of significant and precise questions is an important aspect of research, because the identification of such questions will likely lead to more manipulative studies that will result in a set of principles on which to base sound educational practice. It is hoped the questions raised by the experiments described in this report will be of interest to other researchers in adult education.

REFERENCES

- Ausubel, D. P., & Fitzgerald, D. The role of discriminability in meaningful verbal learning and retention. *J. educ. Psychol.*, 1961, 52, 266-274.
- Ausubel, D. P., & Fitzgerald, D. Organizer, general background, and antecedent learning variables in sequential verbal learning. *J. educ. Psychol.*, 1962, 53, 243-249.
- Ausubel, D. P., & Youssef, M. Role of discriminability in meaningful parallel learning. *J. educ. Psychol.*, 1963, 54, 331-336.
- Bilodeaux, E. A., Bilodeaux, I. M., & Schumsky, D. A. Some effects of introducing and withdrawing knowledge of results early and late in practice. *J. exp. Psychol.*, 1939, 38, 142-144.
- Birren, J. E. (Ed.) *Handbook of aging and the individual*. Chicago: Univer. Chicago Press, 1959.
- Birren, J. E. Adult capacities to learn. In E. C. Fuhlen (Ed.), *Psychological backgrounds of adult education*. Chicago: Center for the Study of Liberal Education for Adults, 1963. Pp. 8-42.
- Schwartz, J. Drives, expectancies, and emotions. In J. E. Birren (Ed.), *Handbook of aging and the individual*. Chicago: Univer. Chicago Press, 1959. Pp. 729-748.
- Brackbill, Yvonne, Wagner, J. E., & Wilson, Dorothy. Feedback delay and the teaching machine. *Psychol. in the Schools*, 1964, 1, 148-154.
- Brinley, J. F. Rigidity and control of cognitive rate in relation to age differences in speed and accuracy of performance. Unpublished doctoral dissertation, Catholic Univer., Washington, D. C., 1962.
- Bugelski, B. R. *The psychology of learning applied to teaching*. Indianapolis: Bobbs-Merrill Co., 1964.
- Burns, H. W. (Ed.) *Sociological backgrounds of adult education*. Chicago: Center for the Study of Liberal Education for Adults, 1964.
- Chown, Sheila M. Age and the rigidities. *J. Geront.*, 1961, 16, 333-342.
- Cornet Instructional Films. *Our solar system*. Tempe, Arizona: Learning, Inc., 1962.
- Fitzgerald, D., & Ausubel, D. P. Cognitive versus affective factors in the learning and retention of controversial material. *J. educ. Psychol.*, 1963, 54, 73-84.

- Carverick, C. M. Retention of school learning as influenced by selected affective tone variables. *J. educ. Psychol.*, 1964, 55, 31-34.
- Gladis, M., & Braum, H. W. Age differences in transfer and retroaction as a function of intertask response similarity. *J. exp. Psychol.*, 1958, 55, 25-30.
- Harlow, H. F. The formation of learning sets. *Psychol. Rev.*, 1949, 56, 51-65.
- Haglin, H. J. Problem solving set in different age groups. *J. Geront.*, 1956, 11, 310-317.
- Knox, A. B., & Sjogren, D. D. Achievement and withdrawal in university adult education classes. *Adult Educ.*, 1965, 15, 74-89.
- Korchin, S., & Basowitz, H. Age differences in verbal learning. *J. abnorm. soc. Psychol.*, 1957, 54, 64-69.
- Kuhlen, R. G. (Ed.) *Psychological backgrounds of adult education*. Chicago: Center for the Study of Liberal Education for Adults, 1965.
- Larimore, Jane, & Becker, W. G. *How to follow the stock market*. Tempe, Arizona: Learning Inc., 1962.
- Lester, O. F. Mental set in relation to retroactive inhibition. *J. exp. Psychol.*, 1932, 15, 681-699.
- Levine, J. M., & Murphy, G. The learning and forgetting of controversial material. *J. abnorm. soc. Psychol.*, 1943, 38, 507-517.
- Lorge, I. The influence of the test upon the nature of mental decline as a function of age. *J. educ. Psychol.*, 1936, 27, 100-110.
- McMahon, F. B. *The Forty-Eight Item Counseling Evaluation Test*. Beverly Hills: Western Psychological Services, 1963.
- Melton, A. W., & Irwin, J. M. The influence of degree of interpolated learning on retroactive inhibition and the overt transfer of specific responses. *Amer. J. Psychol.*, 1940, 53, 173-203.
- Meyer, Susan R. A test of the principles of activity, immediate reinforcement, and guidance as instrumented by teaching machines. Unpublished doctoral dissertation, Univer. of Buffalo, 1960.
- Miles, Catherine C. The influence of speed and age on intelligence scores of adults. *J. gen. Psychol.*, 1934, 10, 208-210.
- Nichols, E. D., Kalin, R., & Garland, H. *Introduction to sets*. New York: Holt, Rinehart and Winston, 1962.

- Hulman, L. *What is Chomsky?* Scranton, Penn.: International Textbook Co., 1962.
- Jones, W. A. Age and mental abilities. *Genet. Psychol. Monogr.*, 1933, 48, 3-54.
- Poe, W. A. *The Poe Inventory of Values*. Lincoln, Nebr.: Univer. of Nebraska, 1937.
- Reid, J. H., Ciardi, J., & Ferrine, L. *Poetry: a closer look*. New York: Harcourt, Brace and World, Inc., 1963.
- Ruch, F. L. The differentiative effect of age upon learning. *J. genet. Psychol.*, 1934, 11, 261-286.
- Sims, H., & Kay, H. Inter-problem interference and age. *J. Geront.*, 1962, 17, 81-87.
- Skinner, B. F. The science of learning and the art of teaching. *Harvard Educ. Rev.*, 1954, 24, 86-97.
- Sorenson, H. Adult ages as a factor in learning. *J. educ. Psychol.*, 1930, 21, 451-459.
- Stake, R. E., & Sjogren, D. D. *Activity level and learning effectiveness*. Title VII Project Number 753 Report, Univer. of Nebraska, 1964.
- Strong, E. K. *Vocational Interest Test*. Stanford, Calif.: Stanford Univer. Press, 1951.
- THI. *Socio Russian*. New York: Grolier Inc., 1960.
- Wechsler, D. *Manual, Wechsler Adult Intelligence Scale*. New York: Psych. Corp., 1935.
- Winer, R. E. Age differences in incidental and intentional learning. *J. Geront.*, 1960, 15, 79-82.
- Winer, B. J. *Statistical principles in experimental design*. New York: McGraw-Hill, 1962.
- Witrock, H. C. Effect of certain sets upon complex verbal learning. *J. educ. Psychol.*, 1963, 54, 85-88.

Appendix A: Questionnaire for Adult Learning Project

1. Name: _____

2. Age: _____

3. Gender: _____

4. Education: _____

Appendix A: Questionnaire for Adult Learning Project

1. Name: _____

2. Age: _____

3. Gender: _____

4. Education: _____

5. Occupation: _____

6. How long have you been working in your current position? _____

Thank you

Questionnaire for Adult Learning Project

Indicate your degree of interest in being a participant in the project.

- Definitely interested.....1()
 Interested, but may not be able to
 participate in entire project.....2()
 Not interested.....3()

Do not
 write

1. Name _____

2. Address _____

()2
 ()3
 ()4
 ()5
 ()6
 ()7
 ()8
 ()9
 ()10

3. Sex (Check one)

- Male.....1()
 Female.....2()

11

3a. Age _____

()12
 ()13

4. Are you now enrolled in an adult education class?
 (Check one)

- Yes.....1()
 No.....2()

14

4a. List the course or courses in which you are enrolled.

4b. Check the agency offering the course or courses in
 which you are enrolled. (If two, check major one)

- Public Schools.....1()
 University or College.....2()
 Business or Trade School.....3()
 YMCA or YWCA.....4()
 Public Library.....5()
 In-service course offered by place of work.....6()
 Other _____.....7()
 (specify)

15

5. Have you completed any adult education courses previous to this one?

Do not
write

None.....1() 16
One course....2()
2-4 courses...3()
5 courses
or more.....4()

6. Check the number of years which have passed since your last formal classroom experience.

Presently enrolled....1() 17
Last semester.....2()
1 year.....3()
2 years.....4()
3 years.....5()
4 years or more.....6()

7. Check the highest grade you have completed.

8th grade or less.....1() 18
9-11th grade.....2()
12th grade.....3()
Trade, business, or tech-
nical school.....4()
1-3 years of college.....5()
College graduate.....6()
Graduate work.....7()
Other _____.....8()
(specify)

8. Are you employed?

Yes.....1() 19
No.....2()

9. (If employed) For whom do you work? () 20
(If self, so indicate.) () 21

10. (If employed) Briefly describe the nature of () 22
your work. (Give job title) () 23

11. Hours worked per week during your regular working season.

Less than 20.....21)
 20-34.....22)
 35-44.....23)
 More than 44.....24)

Do not
 enter

24

12. How many people are employed by you or are under your supervision?

None.....25)
 1-2.....26)
 3-5.....27)
 6-20.....28)
 More than 20.....29)

25

(Discontinue answer items 13-16)

13. For whom does your business work? (If answered as directed on business is selected, indicate what business's occupation was.)

(126
 (127

14. Briefly describe the nature of his work. (Give job title)

(128
 (129

15. Hours worked per week during his regular working season.

Less than 20.....30)
 20-34.....31)
 35-44.....32)
 More than 44.....33)

30

16. How many people employed by him or under his supervision?

Do not
write

None.....1() 31
1-2.....2()
3-5.....3()
6-10.....4()
More than 10....5()

(Items 17 and 18 for farmers and farmers' wives)

17. Do you own or rent your farm?

Own.....1() 32
Rent.....2()

18. Check the size of your farm.

320 acres and over....1() 33
Under 320 acres.....2()

19. Check your first and second choice of times for attending the sessions of the project. The morning sessions will probably run from 9:30 to 11:30, the afternoon sessions from 1:30 to 3:30, and the evening sessions from 7:00 to 9:00. (See item 20 if times listed are inconvenient)

First choice (Check one)

Monday.....1() 34
Tuesday.....2()
Wednesday.....3()
Thursday.....4()
Friday.....5()
Saturday.....6()

(Check time here)

Morning.....1() 35
Afternoon.....2()
Evening.....3()

Second Choice (Check one)

Monday.....1() 36
Tuesday.....2()
Wednesday.....3()
Thursday.....4()
Friday.....5()
Saturday.....6()

(Check time here)

Morning.....1() 37
Afternoon.....2()
Evening.....3()

22. About how much time do you spend reading
magazines or journals in a typical week?

Less than 1 hour.....1()
1-3 hours.....2()
4-6 hours.....3()
7-9 hours.....4()
10 or more hours.....5()

Do not
write

57

23. About how many books have you read in the
past year?

None.....1()
1-3.....2()
4-6.....3()
7-10.....4()
11-20.....5()
21 or more.....6()

58

Do not write	25. About how much time do you spend reading magazines or journals in a typical week?	
	Less than 1 hour	1-2 hours
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		

Appendix B: Biographical Characteristics of Sample

Biographical Characteristics of Sample

Characteristic	Distribution			Per cent Distribution		
	Men	Women	Total	Men	Women	Total
Number of Cases	101	107	208	.49	.51	100.00
Age						
Under 25	12	9	21	.12	.09	.10
25-29	15	24	39	.15	.22	.19
30-34	17	14	31	.17	.13	.15
35-39	11	14	25	.11	.13	.12
40-44	13	10	23	.13	.09	.11
45-49	15	14	29	.14	.13	.14
50-54	4	14	18	.04	.13	.08
55-59	8	6	14	.08	.06	.07
60 and over	6	2	8	.06	.02	.04
Recency of Formal Classroom Experience						
Presently enrolled	26	19	45	.26	.18	.22
Last semester	7	10	17	.07	.09	.08
1 year	4	4	8	.04	.04	.04
2 years	6	4	10	.06	.04	.05
3 years	0	3	3	.00	.03	.01
4 years or more	58	67	125	.57	.62	.60
Highest Grade Completed						
8th grade or less	2	0	2	.02	.00	.01
9-11th grade	7	5	12	.07	.05	.06
12th grade	29	34	63	.28	.32	.30
Trade, bus., or tech.	12	13	25	.12	.12	.12
1-3 yrs. college	20	33	53	.20	.31	.26
College grad.	14	11	25	.14	.10	.12
Grad. work	17	11	28	.17	.10	.13
Enrolled in Adult Education Class						
Yes	39	31	70	.39	.29	.34
No	62	76	138	.61	.71	.66

Biographical Characteristics of Sample

Characteristic	Distribution		Percent Distribution	
	Men	Women	Men	Women
Age				
Under 25	101	107	10.1	10.7
25-34	101	107	10.1	10.7
35-44	101	107	10.1	10.7
45-54	101	107	10.1	10.7
55-64	101	107	10.1	10.7
65-74	101	107	10.1	10.7
75-84	101	107	10.1	10.7
85 and over	101	107	10.1	10.7

Percent of Sample
Distributed by Age

Appendix C: Topic Posttests

Characteristic	Distribution		Percent Distribution	
	Men	Women	Men	Women
Age				
Under 25	101	107	10.1	10.7
25-34	101	107	10.1	10.7
35-44	101	107	10.1	10.7
45-54	101	107	10.1	10.7
55-64	101	107	10.1	10.7
65-74	101	107	10.1	10.7
75-84	101	107	10.1	10.7
85 and over	101	107	10.1	10.7

Life Insurance Posttest

1. Mortgage insurance is a form of _____ insurance.
 - a. paid-up
 - b. endowment
 - c. ordinary life
 - d. term
2. The non-forfeiture provision that is automatic if the others aren't used is the:
 - a. endowment
 - b. paid-up insurance
 - c. extended term insurance
 - d. cash value
3. Which of the following is not a basic kind of insurance policy?
 - a. endowment
 - b. paid-up
 - c. ordinary life
 - d. term
4. Most people who buy insurance pay a
 - a. loaded premium
 - b. level premium
 - c. single premium
 - d. step-rate premium
5. If a person takes out a new insurance policy each year to replace the previous year's policy, he would pay a
 - a. loaded premium
 - b. level premium
 - c. single premium
 - d. step-rate premium
6. The probability that some hazard will occur within a certain period of time is called
 - a. a chance
 - b. an expectancy
 - c. a risk
 - d. an event

7. Which of the following is the largest?
- operating premium
 - gross premium
 - basic premium
 - net premium
8. When a life insurance salesman tells a potential buyer how much the premium will be, he is talking about the
- basic premium
 - gross premium
 - loaded premium
 - net premium
9. The individual to whom a claim is paid is the
- insurer
 - beneficiary
 - insured
 - policy holder
10. A special need during the dependency period is
- paying for the last expenses
 - helping the children develop an annuity
 - reinvesting the life insurance money
 - paying off the mortgage on a home
11. Social Security is sometimes called
- health, educational, and welfare insurance
 - retirement and dependency insurance
 - old-age, survivors, and disability insurance
 - maturity insurance
12. One's house would be considered
- an acquired asset
 - a natural resource
 - an acquired liability
 - a potential asset
13. An economic resource is
- any money available except current wages and salary
 - a natural resource
 - a reserve for emergencies
 - a source of income

14. The extended term insurance provision is made available
- as a service to people who are forced to lapse their policies
 - to extend the length of time of a term insurance policy
 - as a feature on some policies to meet competition
 - because the cash value of the policy buys up so much term insurance when the policy lapses
15. An individual needs \$30,000 of insurance protection for the next 15 years and \$15,000 thereafter. Which of the following plans would probably cost the least?
- buying a \$30,000 term policy for 15 years and after 15 years buying an ordinary life policy
 - buying a \$15,000 life policy and a \$15,000 term policy for a term of fifteen years.
 - buying a \$30,000 ordinary life insurance policy
 - all of the above would cost the same since his probability of dying is the same in all cases
16. A person is more likely to lapse his policy if he pays a _____ premium.
- gross
 - level
 - single
 - step-rate
17. A person who buys insurance for one year at a time will
- pay high premiums during the first few years and then pay lower premiums
 - pay the same premiums each year, but his original premium is high
 - pay a higher premium each time because he doesn't accumulate interest on his money
 - pay a higher premium each time because his probability of dying increases each year.
18. Which of the following probably needs the largest amount of life insurance? (Assuming the yearly income in all homes is the same.)
- a 27 year old housewife with a husband and 3 young children
 - a 34 year old man with 2 young children
 - a 65 year old man with adult children
 - a 42 year old bachelor

19. A basic principle that favors buying life insurance is that
- the company can invest your money better than you can
 - you are helping society by contributing to insurance
 - adequate protection can be obtained right away against economic losses
 - it is a good investment because the money earns a high rate of interest
20. Which of the following is the best example of a potential asset?
- a person can expect to get a gift of \$5,000 from his rich uncle in the next 5 years
 - a person will keep his \$5,000 life insurance policy for the next 5 years
 - a person will have \$5,000 more than now in his savings account in 5 years
 - a person's income might be \$5,000 a year greater in five years
21. In the long run, which of the following would likely be least costly for an insurance buyer?
- level premium
 - single premium
 - step-rate premium
 - the cost would be the same for all three
22. The probability of dying at age 35 is .00428. For \$1,000 of insurance at the age of 35, assuming no other factors, the person would pay about
- \$ 8.28
 - 400.00
 - 40.00
 - 4.00

23. Age	Number living at beginning of year	Number dying during the year
10	1,002,000	2,000
11	1,000,000	3,000

The death rate at age 11 is approximately

- 30 per 1,000
- 3 per 1,000
- 2.1 per 1,000
- 2 per 1,000

24. A basic principle of life insurance is that

- a. the company bets a person won't die in a particular period of time
- b. risks can be assumed more readily by a group than by a single individual
- c. a group of people can each contribute a small amount to help when someone dies
- d. losses can be avoided by insuring

25. The two advantages that life insurance has over other economic resources as a means of protection are

- a. it can be immediately converted in to cash by the buyer and is available for all people
- b. it enforces savings and provides for all needs
- c. it can be large enough to meet needs and is available for all people
- d. it is tax free and costs very little

State Government Posttest

1. The will of a person is handled by
 - a. the county attorney
 - b. a probate court
 - c. the district court
 - d. the county court
2. When a District Court judgeship is vacated, the post is filled
 - a. by a Governor's appointment
 - b. with a special election
 - c. by a selection committee's appointment
 - d. in the next election
3. How many associate justices are there on the Nebraska Supreme Court?
 - a. nine
 - b. six
 - c. eighteen
 - d. seven
4. The proportion of senators needed to override a Governor's veto of a bill is
 - a. over $1/2$
 - b. $3/4$
 - c. $3/5$
 - d. $2/3$
5. A signed bill without an emergency clause becomes law
 - a. after a referendum has been held
 - b. three months after the legislature adjourns
 - c. three months after the Governor signs it
 - d. immediately when the Governor signs it
6. The Governor may introduce bills to the legislature
 - a. at any time during the regular session
 - b. during the interim when the legislature is not in session
 - c. only at the request of a senator
 - d. only during the first 20 days of the session

7. The report of the activities of the legislature is called the
 - a. Congressional Record
 - b. Nebraska Legal Review
 - c. Session Laws of Nebraska
 - d. Nebraska Legislative Journal
8. The presiding officer of the state senate is the
 - a. President Pro-tem
 - b. Governor
 - c. Speaker
 - d. Lieutenant Governor
9. The regular session of the legislature convenes
 - a. on the first Tuesday after New Year's Day each year
 - b. on the first Tuesday in January of even-numbered years
 - c. on the first Tuesday in January of odd-numbered years
 - d. on the first Tuesday in November of even-numbered years
10. The present Nebraska State Senators were elected for a term of
 - a. two years
 - b. indefinite length
 - c. four years
 - d. one year
11. Which one of the following is not a requirement for a person to be elected a state senator?
 - a. he must be a taxpayer
 - b. he must be a resident of the district for one year immediately before the election
 - c. he must have been born in the state
 - d. he must be an elector
12. How many state legislative districts are in Nebraska?
 - a. 3
 - b. 43
 - c. 49
 - d. 4

13. A legislature that has two houses such as a senate and house of representatives would be called a
- a. non-partisan legislature
 - b. bicameral legislature
 - c. partisan legislature
 - d. unicameral legislature
14. Most people feel that a judgeship should not be politically determined. Nebraska has attempted to eliminate politics from the determination of judgeships by
- a. appointing a person judge for life
 - b. having the non-partisan legislature elect the judges
 - c. having judges appointed from names recommended by a non-partisan committee
 - d. electing judges on non-partisan ballots
15. Which of the following is the most accurate example of appellate jurisdiction of a district court?
- a. appeals against the state such as in tax cases are first heard in district court
 - b. a criminal case tried in county court is then taken to the district court
 - c. a divorce case is taken to the district court after being heard in county court
 - d. a criminal case tried in the district court is then taken to the Supreme Court.
16. Which of the following procedures could not be used to repeal a law passed in the 1961 legislative session?
- a. any of b, c, or d could be used
 - b. a bill in the next legislature
 - c. an initiative petition
 - d. a referendum petition
17. If the Governor will not sign or veto a bill, the bill
- a. is submitted to the people for vote
 - b. is reintroduced in the next legislature
 - c. becomes a law after a few days
 - d. does not become law

18. The emergency clause enables the legislature to
 - a. pass bills that should become law immediately
 - b. pass bills when the legislature is not in session
 - c. get a bill debated before its turn
 - d. pass bills during a state of national emergency
19. Committees in the legislature have several purposes, one of which is to
 - a. run the government when the legislature is not in session
 - b. hold hearings on pending bills
 - c. investigate the work of the Governor
 - d. take a preliminary vote on all bills
20. The governor cannot veto a law passed by initiative because
 - a. such a veto has been declared unconstitutional by the Supreme Court
 - b. such laws are passed to control the Governor so it would be unreasonable to allow him to veto them
 - c. there is no provision in the constitution for a veto of initiative even though such a power of veto might be desirable in principle
 - d. the law reflects the desires of the voters so that a veto would be going against the wishes of the people
21. The Committee on Committees is a powerful group because
 - a. it is made up of the most popular members of the Senate
 - b. it serves as a balance on the Governor
 - c. it can influence legislation by determining which Senators will be on what committees
 - d. all bills introduced must be voted on in this committee
22. If during a special session called to deal with a tax problem, it became apparent that new legislation on education is needed because of a Supreme Court decision, which one of the following would be the correct procedure?
 - a. Since one special session has been called, another one cannot be called, and the education legislation will have to wait until the next regular session
 - b. The Governor will expand his original call to deal with the new problem
 - c. Another special session will be called after the first one is over to deal with the education problem
 - d. Since the legislature is already in session it can deal with the legislation on education

23. The Nebraska Unicameral was designed to minimize bickering between political factions. This was supposedly accomplished by
- a. having only independents run for the legislature
 - b. not labeling a candidate as a member of a political party on the ballot
 - c. eliminating all political parties from the state government
 - d. having only independents run for the legislature
24. The essential difference between referendum and initiative is
- a. that the Governor can veto a referendum vote but not an initiative vote
 - b. the number of votes needed to pass the petition
 - c. that one is for new legislation and the other to review legislation
 - d. the number of signatures required on the petition
25. Which of the following could be a valid initiative petition?
- a. The petition for an amendment has 40,000 signatures out of 500,00 electors.
 - b. Of 500,000 electors, 80,000 have signed it; 70,000 of the 80,000 live in Lancaster and Douglas counties.
 - c. Signers were from 35 of the counties.
 - d. Of 500,000 electors, 30,000 have signed it.

Stock Market Posttest

1. Stocks and bonds are both referred to as
 - a. policies
 - b. certificates
 - c. securities
 - d. deeds
2. The profits shared by the investors are called
 - a. shares
 - b. dividends
 - c. interest rates
 - d. claims
3. A stock bought and sold on the American Stock Exchange is
 - a. an unlisted stock
 - b. a listed stock
 - c. an exchange stock
 - d. a preferred stock
4. A stock in a very reputable company is called a
 - a. preferred stock
 - b. common stock
 - c. "blue chip" stock
 - d. listed stock
5. A stock that changes $+3/8$ of a point has gone up
 - a. 12 $1/2$ cents
 - b. 30 cents
 - c. 25 cents
 - d. 37 $1/2$ cents
6. The year's high for a stock was 22 $3/4$. This quotation means the highest price for the stock during the year was
 - a. \$22.75
 - b. .2275
 - c. 2.275
 - d. none of the above

7. An "over the counter" transaction refers to the
- a. buying and selling of stock that is not on a stock exchange
 - b. paying of cash for a stock
 - c. illegal trading of stocks
 - d. day-to-day transactions of a licensed stock broker
8. An odd-lot is
- a. a group of stocks seldom traded on the market
 - b. a number of stocks in different companies offered in one lot
 - c. less than the usually traded group of 100 shares
 - d. the one or two stocks often remaining after a transaction
9. You may tell your broker to sell at a certain price or buy at a certain price. Such an order is called
- a. a good till cancelled order
 - b. a stop order
 - c. a limiting order
 - d. an indefinite sell order
10. A technique used to protect profits is to
- a. place a stop order when the stock falls below the price paid for it
 - b. sell short
 - c. trail a stop when the price is rising
 - d. manipulate for paper profits
11. When a buyer uses credit to buy stocks the amount of money he actually pays is called
- a. the down payment
 - b. the money transaction
 - c. the equity
 - d. the margin
12. The right to buy or sell specific securities at a certain price within a certain time is called
- a. an option
 - b. covering short
 - c. a limit order
 - d. "in and out"

13. If a stock goes up to a price higher than the price paid for it, the buyer

a. should sell it
 b. has made a paper profit
 c. has increased his margin
 d. is engaged in speculation

37	21	ALP .50	2	34 7/8	35	34 3/8	34 3/8	- 1/2
100 1/2	81 1/4	Aqua	1	86	86	86	86	+ 1
99 1/4	66	Mead	87	23 7/8	29 1/4	23 1/4	23 3/4	+ 3/4
561	49 1/2	XYZ	76	550	550 1/2	545	546	- 3 1/2

The following four questions refer to the above excerpt from an imaginary stock listing.

14. Which of the stocks shows a dividend

a. ALP
 b. Aqua
 c. Mead
 d. XYZ

15. Which of the stocks opened at the same price as it closed the previous day?

a. ALP
 b. Aqua
 c. Mead
 d. XYZ

16. Which stock had the most sales?

a. ALP
 b. Aqua
 c. Mead
 d. XYZ

17. Which stock fluctuated in value most during the day's trading?

a. ALP
 b. Aqua
 c. Mead
 d. XYZ

18. The margin requirement for a certain stock is 60 per cent. How much per stock would the broker lend the buyer if the price of the stock is \$200?
- a. \$120
 - b. 60
 - c. 100
 - d. 80
19. In the usual situation a person who borrows part of the purchase price from a broker to buy stocks must pay the money to the broker
- a. within 90 days
 - b. within 60 days
 - c. within an indefinite period
 - d. out of the paper profits
20. The labels "bull" and "bear" are more likely to be applied to
- a. speculators
 - b. investors
 - c. brokers
 - d. agents
21. The technique of "selling short" would most likely be used by
- a. brokers
 - b. "bulls"
 - c. "bears"
 - d. profit takers
22. The individuals who are paid first out of a company's earnings are the
- a. executives
 - b. bond holders
 - c. preferred stock holders
 - d. common stock holders
23. A "bear" market is more likely to be the condition when
- a. the supply of stocks does not meet the demand
 - b. the supply of stocks and the demand is roughly in balance
 - c. the supply of stocks exceeds the demand
 - d. none of the above three is pertinent

24. An owner has told his broker to hold a stock in a certain company as long as it is rising, but to sell the stock when it drops five points. The owner has used
- a. a stop order
 - b. a good till cancelled order
 - c. a limiting order
 - d. a trail to stop order
25. The difference between a "paper profit" and "profit taking" is that
- a. a "paper profit" is a larger profit than one gets in "profit taking"
 - b. in "profit taking" a transaction takes place while no transaction is necessary for a "paper profit"
 - c. the investor is more concerned with "profit taking" while a speculator is interested in "paper profits"
 - d. a "paper profit" is artificial and actually not a realizable profit while "profit taking" is real

Art Posttest

1. In drawings a feeling of majesty and power is often conveyed by the use of
 - a. perceptual constancy
 - b. vertical lines
 - c. linear perspective
 - d. horizontal lines
2. The shades of gray in a drawing are referred to as
 - a. values
 - b. feelings
 - c. shadings
 - d. dimensions
3. Artists often distort forms because
 - a. this is the way the forms really are
 - b. they want to be different
 - c. this is a way to emphasize feelings
 - d. they want to create an illusion of reality
4. The areas in a drawing where the light strikes are called
 - a. reflections
 - b. illusions
 - c. light sources
 - d. highlights
5. Railroad tracks are drawn to meet at a point. This point is referred to as
 - a. an end point
 - b. a focus point
 - c. a vanishing point
 - d. a horizon point
6. Aerial perspective would likely be used in
 - a. a portrait
 - b. a landscape
 - c. an image
 - d. modern art

7. In a still life drawing such as of a vase of flowers, the three dimensional appearance of the vase will be achieved by the use of
 - a. size perspective
 - b. perception
 - c. values
 - d. lights
8. A saucer viewed from above is circular, but from an angle it is oval. We see it in either case as circular. This example illustrates
 - a. perceptual constancy
 - b. an illusion of reality
 - c. aerial perspective
 - d. a distortion
9. A feeling of involvement or unity can be gained through the use of
 - a. vertical curves
 - b. horizontal curves
 - c. concave curves
 - d. convex curves
10. What determines whether a curve is convex or concave?
 - a. the amount of bend in the curve
 - b. the vantage point of the observer
 - c. the size of the curve
 - d. the placement of the curve in the drawing
11. An artist wishes to convey a feeling of delicacy and tranquility. His drawing would likely have
 - a. dark values with a vertical emphasis
 - b. light values with a diagonal emphasis
 - c. medium values with a horizontal emphasis
 - d. light values with a horizontal emphasis
12. "Thickness" is a term used to describe a line's
 - a. quality
 - b. direction
 - c. emphasis
 - d. value

13. Perspective can be achieved by having objects in the foreground overlap objects behind them. This is a technique called
- a. linear perspective
 - b. interposition
 - c. focusing
 - d. highlighting
14. A person performing some action would have lines with
- a. a vertical direction
 - b. a horizontal direction
 - c. a linear direction
 - d. a diagonal direction
15. In a drawing color is represented by different
- a. highlights
 - b. illusions
 - c. feelings
 - d. values
16. Which of the following best describes the purpose of an artist in making a drawing?
- a. confusion
 - b. communication
 - c. distortion
 - d. rebellion
17. Which of the following is a shape rather than a form?
- a. sphere
 - b. cone
 - c. square
 - d. cube
18. Which of the following artists made least use of perspective in his pictures?
- a. Signorelli
 - b. Rubens
 - c. Picasso
 - d. Tintoretto

19. The point where parallel lines meet is

- a. usually in the foreground of a picture
- b. in the center of the picture
- c. usually a point of emphasis
- d. usually on the horizon line

20. The basic elements of a drawing are the

- a. lines
- b. forms
- c. shapes
- d. values

Poetry Posttest

1. A distinguished American poet who wrote "Stopping by Woods on a Snowy Evening" was
 - a. Ralph Waldo Emerson
 - b. Karl Shapiro
 - c. Robert Frost
 - d. Carl Sandborg
2. The simple narration of an incident in a poem is often referred to as the
 - a. surface meaning
 - b. profound meaning
 - c. narrative incident
 - d. ambiguity
3. A word that stands for something else is called
 - a. a synonym
 - b. a symbol
 - c. an antonym
 - d. a sign
4. In a poem, a character who plays against the main character is referred to as the
 - a. antagonist
 - b. foil
 - c. protagonist
 - d. villain
5. Resonance in poetry refers to
 - a. the mood of the poem
 - b. the sense of the poem
 - c. the rhythm of the poem
 - d. the sounds of the poem
6. Context in poetry refers to
 - a. the content of the poem
 - b. the elements of the poem that bring out the mood of the poem
 - c. the setting in which the poet wrote the poem
 - d. the rhyme pattern of the poem

7. For most poems with four line verses the rhyme pattern is
- a. a-b-a-b
 - b. a-a-b-b
 - c. a-b-b-a
 - d. b-b-a-a
8. The sections of a poem are most accurately called
- a. verses
 - b. stanzas
 - c. sonnets
 - d. parts
9. When a poem has two or more meanings it is said to be
- a. confusing
 - b. deceptive
 - c. superficial
 - d. ambiguous
10. "Stopping by Woods on a Snowy Evening" ends with the line "And miles to go before I sleep". The deeper meaning of these lines might be
- a. the narrator is a long way from home
 - b. the narrator is tired and wants to die
 - c. the narrator has many things to do in his life yet
 - d. the narrator is impatient to get to work
11. In Italian, the word "stanza" means
- a. a verse of a poem
 - b. the rhyme pattern of a poem
 - c. a room of a house
 - d. the building or "standing" of a house
12. The surface meaning of a poem is
- a. the simple description of an event
 - b. superficial and really is without meaning
 - c. usually the meaning the poet is most concerned with
 - d. not an important part of the poem

13. Usually both poems and proverbs
- rely heavily on rhyming
 - are ambiguous
 - have two or three surface meanings
 - are in prose form
14. Which of the following is not influencing the man in "Stopping by Woods on a Snowy Evening?"
- the brute world of the horse
 - the social world of the owner
 - the world of the poet
 - the dark world within himself
15. Which of the following is the best paraphrase of the meaning of "Stopping by Woods on a Snowy Evening" from the program writer's point of view?
- Appreciation of beauty is more important than one's social responsibilities
 - The woods are beautiful on a snowy evening
 - One has certain obligations that are more important than living only for one's own enjoyment
 - One should be appreciative of beauty but should not sacrifice social obligations and duties for beauty
16. Which of the following is the rhyme pattern of stanza one of "Stopping by Woods on a Snowy Evening?"
- a-a-b-a
 - a-b-a-b
 - a-b-a-a
 - a-b-b-a
17. The first line of "Stopping by Woods on a Snowy Evening" is
- Whose woods are these I do not know
 - Whose woods these are I think I know
 - These woods are whose, I do not know
 - The man whose woods these are I know
18. The horse in "Stopping by Woods on a Snowy Evening" is a symbol of
- the veneer of the social world
 - the impatience of the brute world
 - the gentleness and patience of the animal world
 - the conflict between man and animals

19. The specific purpose of the journey of the man in "Stopping by Woods on a Snowy Evening" is
- a. to visit the owner of the woods
 - b. to see the beauty in the woods
 - c. not known by the reader
 - d. to go many miles before going to bed
20. What difficult rhyming was accomplished in "Stopping by Woods on a Snowy Evening?"
- a. quadruple rhyming
 - b. double rhyming
 - c. triplicate rhyming
 - d. singular rhyming

Solar System Posttest

1. "It is quite evident that the planets do not travel around the sun in circles but in ellipses." Which of the following persons would most likely have made this statement?
 - a. Aristotle
 - b. Ptolemy
 - c. Kepler
 - d. Copernicus
2. Only one side of the planet Mercury is ever seen in the sunlight because
 - a. Mercury does not spin
 - b. Mercury's period of rotation and revolution are equal
 - c. Mercury does not revolve around the sun
 - d. Mercury's period of revolution is so rapid it stays even with the sun
3. The unique characteristic of the planet Saturn is
 - a. the 18 moons around it
 - b. the fact that it is not visible from the earth
 - c. the three rings around it
 - d. that it is the smallest planet
4. The other planet most similar to the planet Earth in size and distance from the sun is
 - a. Mercury
 - b. Venus
 - c. Saturn
 - d. Pluto
5. The path a planet follows around the sun is called its
 - a. period of revolution
 - b. axis
 - c. orbit
 - d. path of rotation
6. Nobody really knows what the planet Venus is like because
 - a. the recent space shot to Venus failed
 - b. it is so far away it can't be seen with a telescope
 - c. it is on the opposite side of the sun from the Earth
 - d. it is surrounded by a thick layer of clouds

7. The Earth has a movement called a precession. This refers to
- a. the spinning of the earth
 - b. a gradual moving away from the Sun because of centrifugal force
 - c. the movement around the Sun
 - d. a gradual change in the direction in which the Earth's axis points
8. Astronomers believe only two planets can have life forms on them. They are the Earth and _____.
- a. Mars
 - b. Mercury
 - c. Saturn
 - d. Jupiter
9. The largest planet in our solar system is
- a. Mars
 - b. Jupiter
 - c. Earth
 - d. Venus
10. One reason why the present theory of the solar system is more useful than theories held 2000 years ago is that
- a. our theory is more modern now
 - b. the early theories were too simple to explain well everything about the solar system
 - c. present theory applies to all solar systems
 - d. present theory explains the same events in the solar system as well as early theories and more simply.
11. A body that produces its own heat and light is called
- a. a star
 - b. a planet
 - c. a moon
 - d. a comet
12. The movement of a planet on its axis is called
- a. rotation
 - b. revolution
 - c. precession
 - d. orbiting

13. The terms "morning star" or "evening star" refer to
- a. the sun
 - b. the planet Venus
 - c. the planet Mars
 - d. the sun of the solar system nearest ours
14. The earth's diameter is larger at the equator than at the poles because
- a. the moon's gravity makes the earth bulge at the equator.
 - b. solar dust has been picked up at the equator.
 - c. the spinning of the earth on its axis creates a bulge at the equator.
 - d. the weight of the ice caps at the poles compresses the earth at the poles.
15. The planet Mars has a predominant color of
- a. yellow
 - b. white
 - c. red
 - d. silver
16. The planet with the most moons is
- a. Saturn
 - b. Uranus
 - c. Mars
 - d. Jupiter
17. One unique characteristic of the planet Jupiter is
- a. that its period of revolution is longer than for the other planets.
 - b. the ring around it like a belt.
 - c. a spot on it called the "Great Red Spot".
 - d. the extremely high temperature on its surface.
18. The three closest planets in order from the sun are
- a. Jupiter, Saturn, Mars
 - b. Earth, Saturn, Jupiter
 - c. Saturn, Earth, Jupiter
 - d. Mars, Jupiter, Saturn
20. The Greek word planet means
- a. heavenly body
 - b. wanderer
 - c. starlike
 - d. revolve

Chanukah Posttest

1. Judaism is to the Jews as Hellenism is to the
 - a. Greeks
 - b. Persians
 - c. Romans
 - d. Egyptians
2. The source of the Jewish way of life is prescribed in the
 - a. Koran
 - b. Apocrypha
 - c. Torah
 - d. Bible
3. The Syrian king who demanded that the Jews adopt the Greek way of life was
 - a. Mattathias
 - b. Judah
 - c. Antiochus
 - d. Eliezer
4. The first man responsible for opposing the Syrian army was
 - a. Judah
 - b. Malachi
 - c. Mattathias
 - d. Hasmonean
5. The priestly family name of those who began the rebellion against the Greek culture was
 - a. Levites
 - b. Hasmoneans
 - c. Maccabeans
 - d. Jesuits
6. The general of the victorious Maccabean army was
 - a. Antiochus
 - b. Judah
 - c. Haggai
 - d. Mattathias

7. The city where the first rebellious act against the Greek culture took place was
 - a. Modin
 - b. Jerusalem
 - c. Hebron
 - d. Antioch
8. The English translation of "Maccabee" is
 - a. dedication
 - b. hammerer
 - c. Festival of Lights
 - d. praise
9. The Hebrew month of Kislev corresponds to the civil month of
 - a. October
 - b. November
 - c. December
 - d. January
10. The Hebrew word "Chanukah" means
 - a. For the Miracle
 - b. dedication
 - c. hammerer
 - d. Festival of Lights
11. "Whoever is for God, let him come unto me" was the slogan of the
 - a. Greeks
 - b. Syrian Jews
 - c. Egyptians
 - d. Syrian Greeks
12. The victory of the Maccabees over the Syrian army took place in
 - a. 75 B.C.E.
 - b. 135 B.C.E.
 - c. 165 B.C.E.
 - d. 185 B.C.E.
13. The traditional material used for the kindling of the lights for the celebration of Chanukah was
 - a. wood shavings
 - b. olive oil
 - c. candles
 - d. ointment

14. The celebration of the minor festival of Chanukah is observed for
- 12 days
 - 10 days
 - 8 days
 - 6 days
15. After the death of Alexander the Great the Greek empire was divided into two smaller empires which were
- Syria and Judea
 - Egypt and Persia
 - Judea and Samaria
 - Syria and Egypt
16. The Jewish religion is monotheistic which means
- a name for the Jewish God is Monothea.
 - the religion has one God.
 - the religion has many Gods of equal importance.
 - the religion has one main God, but several secondary Gods.
17. The word Menorah refers to
- a Jewish general
 - a temple
 - a candelabra
 - a city
18. The celebration of the Jewish holiday called Chanukah occurs about the same time as the Christian holiday of
- Easter
 - Pentecost
 - Christmas
 - All Saints Day
19. One distinction between a major Jewish holiday and a minor one is that
- during a major holiday work is not permitted
 - a major holiday celebrates a major turning point in Jewish history
 - major holidays are observed by all members of the religion, whereas only a few celebrate the minor holidays
 - the major holidays commemorate religious events and the minor holidays commemorate civil events

20. The reason the lights are placed in a window during Chanukah is

- a. to symbolize the religion as a guiding light
- b. to fulfill the law which asks that the miracle be proclaimed
- c. to demonstrate to others that the holiday is being celebrated
- d. to maintain the atmosphere of gaiety of the celebration

Introduction to Sets Posttest

1. Which is the correct abbreviation for the set of numbers 8, 3, 17?
 - a. 8, 3, 17
 - b. $\{8, 3, 17\}$
 - c. $(8, 3, 17)$
 - d. numbers 8, 3, 17
 - e. none of these
2. Which is the correct abbreviation for - 6 is a member of $\{2, 6, 17, 4\}$?
 - a. 6 belongs to the set of numbers 2, 6, 17, 4
 - b. $\{2, 6, 17, 4\}$ includes 6
 - c. $6 \notin \{2, 6, 17, 4\}$
 - d. $6 \in \{2, 6, 17, 4\}$
 - e. none of these
3. Which is the correct abbreviation for - $\{2, 3\}$ is equal to $\{3, 2\}$?
 - a. $\{2, 3\} \subseteq \{3, 2\}$
 - b. $\{2, 3\} \subset \{3, 2\}$
 - c. $\{2, 3\} \supseteq \{3, 2\}$
 - d. $\{2, 3\} \supset \{3, 2\}$
 - e. none of these
4. Which is the correct abbreviation for - $\{1, 7\}$ is a subset of $\{3, 7, 2, 1\}$?
 - a. $\{1, 7\} \subset \{3, 7, 2, 1\}$
 - b. $\{3, 7, 2, 1\} \subset \{1, 7\}$
 - c. $\{1, 7\} \subseteq \{3, 7, 2, 1\}$
 - d. $\{3, 7, 2, 1\} \subseteq \{1, 7\}$
 - e. none of these
5. Which is the correct abbreviation for - 3 is not a member of $\{2, 4, 6, \dots\}$?
 - a. $3 \in \{2, 4, 6, \dots\}$
 - b. $3 \notin \{2, 4, 6, \dots\}$
 - c. $3 \notin (2, 4, 6, \dots)$
 - d. $3 \notin (2, 4, 6, \dots)$
 - e. none of these

6. Which is the correct abbreviation for the empty set?
- $\emptyset$
 - 0
 - $\bar{O}$
 - the null set
 - none of these
7. The correct braces-name for the set of all counting numbers between 43 and 48 is
- { 43, 44, 45, 46, 47, 48 }
 - { 43, 44, 45, 46, 47 }
 - { 44, 45, 46, 47 }
 - { 44, 45, 46, 47, . . . }
 - none of these
8. The correct braces-name for the set of the first 6 odd numbers is
- { 1, 2, 3, 4, 5, 6 }
 - { 1, 3, 5 }
 - { 2, 4, 6, 8, 10, 12 }
 - { 1, 3, 5, 7, 9, 11 }
 - none of these
9. The correct braces-name for the set of all counting numbers divisible by 4 is
- { 4 }
 - { 2, 4, 6, 8, . . . }
 - { 8, 16, 24, 32, . . . }
 - { 4, 8, 12, 16, . . . }
 - none of these
10. The correct braces-name for the set of all counting numbers is
- { 1, 2, 3, 4, . . . }
 - 1, 2, 3, 4, . . .
 - { 100, 99, 98, 97, . . . }
 - { 2, 4, 6, 8, . . . }
 - none of these
11. The correct braces-name for the set of all counting numbers greater than 7 is
- { 7, 8, 9, 10, . . . }
 - { 7, 6, 5, 4, 3, 2, 1 }
 - { 8, 9, 10, 11, . . . }
 - { 8, 9, 10, 11 }
 - 8, 9, 10, 11, . . .

12. Which of the following symbols in place of γ in $6 \gamma [5, 43, 19, 6, 217]$ will give a true statement?
- $=$
 - $\subset$
 - $\in$
 - $\notin$
 - $\emptyset$
13. Which of the following symbols in place of γ in $(6) \gamma (5, 43, 19, 6, 217)$ will give a true statement?
- $=$
 - $\subset$
 - $\in$
 - $>$
 - $\emptyset$
14. Which of the following symbols in place of γ in $[2, 5, 4] \gamma (4, 2, 5)$ will give a true statement?
- $=$
 - $\subset$
 - $\in$
 - $\notin$
 - $\emptyset$
15. Which of the following symbols in place of γ in $(4, 2, 5) \gamma (2, 4)$ will give a true statement?
- $=$
 - $\subset$
 - $\in$
 - $\notin$
 - $\emptyset$
16. Which of the following describes correctly a one-to-one correspondence between all the numbers of $\{7, 8, 9, 10, \dots\}$ and all the numbers of $\{27, 28, 29, 30, \dots\}$?
- Pair any number from the first set with that number from the second set which is 21 less.
 - Pair any number from the first set with that number from the second set which is 20 more.
 - Pair any number from the first set with that number from the second set which is 21 more.
 - Pair any number from the first set with that number in the second set which is 20 less.
 - none of these

17. How many numbers belong to the set of counting numbers between 6 and 12?
- a. 3
 - b. 4
 - c. 5
 - d. 6
 - e. 7
18. How many numbers belong to the set of even counting numbers 6 and 12?
- a. 2
 - b. 3
 - c. 4
 - d. 5
 - e. 6
19. How many numbers belong to the set of odd counting numbers between 6 and 12?
- a. 2
 - b. 3
 - c. 4
 - d. 5
 - e. 6
20. 5 is a _____ of { 8, 9, 12 }.
- a. number
 - b. subset
 - c. group
 - d. set
 - e. none of these

Russian Posttest

For each of the English words select the combination of Russian letters that most closely approximates the same sound.

Part I

1. sandy

- a. САНДИ
- b. ΣАННТН
- c. ΣАННТ
- d. САНДИ

2. brawl

- a. МПРОΛ
- b. БЯОЛ
- c. БРОЛ
- d. МПЯАЛ

3. please

- a. ПΛНЗ
- b. РЛЗС
- c. ПЛИС
- d. ПΛНΣ

4. tells

- a. ТЕΛΣ
- b. ТЗЛС
- c. ТЗΛС
- d. ТЕЛС

5. trek

- a. ТЯЕК
- b. ТРЕС
- c. ТЯЗС
- d. ТРЗК

6. breed

- a. НТЯЕМ
- b. БРИД
- c. МПРННТ
- d. ДЯНБ

7. zebra

- a. ЗИБРО
- b. ЗЕМПЯА
- c. ЗННТЯО
- d. ЗНМПРО

8. pebble

- a. РЗБΛ
- b. ПЗБЛ
- c. ПЕМПΛ
- d. БЗНТП

9. select

- a. ΣНΛЕКТ
- b. ΣЕПЕСТ
- c. КИПЗСТ
- d. СИЛЗКТ

10. drink

- a. ДРИНК
- b. НТРННК
- c. ДЯНИК
- d. МПЯНИК

Hand in this sheet and ask for Part II.

Part II

For each of the Russian letter combinations select the English letter combination that most closely approximates the sound. Notice that not all of the English choices are words.

11. П Л Э З А Н Т

- a. present
- b. pleasant
- c. drezent
- d. crescent

13. К Р А Д Л

- a. cripple
- b. capald
- c. clapped
- d. cradle

15. Т О Р Э Н Т

- a. topesht
- b. torrent
- c. torah
- d. torment

17. Б А Д Л И

- a. barren
- b. badly
- c. baldy
- d. dalden

19. Р А Т Э Н С К

- a. pateshk
- b. rateesh
- c. ratensk
- d. patzeek

12. К А Б И С

- a. cadets
- b. cabens
- c. cabees
- d. cadence

14. Р И Л И С

- a. peerless
- b. peleek
- c. release
- d. rupees

16. С П О Л

- a. crop
- b. spore
- c. spawl
- d. clod

18. Н О З И О

- a. hoeno
- b. nozeeno
- c. notion
- d. nausea

20. П О З

- a. pause
- b. rose
- c. loz
- d. pose

Greek Posttest

For each of the English words select the combination of Greek letters that most closely approximates the same sound.

Part I

1. sandy

- a. САНДИ
- b. ΣΑΝΝΤΗ
- c. ΣΑΝΝΤ
- d. САНДИ

2. brawl

- a. МП РОΛ
- b. БЯ ОΛ
- c. БР ОΛ
- d. МПЯ ΑΛ

3. please

- a. ΡΛΗΣ
- b. ΡΛЭС
- c. ΠΛΙC
- d. ΠΛΗΣ

4. tells

- a. ΤΕΛΣ
- b. ΤЭΛC
- c. ΤЭΛC
- d. ΤΕΛC

5. trek

- a. ΤЯЕК
- b. ΤΡΕC
- c. ΤЯЭС
- d. ΤΡЭК

6. breed

- a. ΝΤЯЕМΠ
- b. БРИΔ
- c. ΜΠΡΗΝΤ
- d. ДЯНБ

7. zebra

- a. ΖΗΒΡΟ
- b. ΖΕΜΠЯΑ
- c. ΖΗΝΤЯО
- d. ΖΗΜΠΡΟ

8. pebble

- a. ΡЭБΛ
- b. ΠЭБΔ
- c. ΠЕМΠΛ
- d. БЭНТП

9. select

- a. ΣΗΛΕΚΤ
- b. ΣΕΠЕСТ
- c. ΚΗΠЭCΤ
- d. CИΛЭΚΤ

10. drink

- a. ΔΡΗΗΚ
- b. ΝΤΡΗΗΚ
- c. ДЯНΗΚ
- d. ΜΠЯНΗΚ

Hand in this sheet and ask for Part II.

Part II

For each of the Greek letter combinations select the English letter combination that most closely approximates the sound. Notice that not all of the English choices are words.

11. Π Λ Ε Ζ Α Ν Τ

- a. present
- b. pleasant
- c. drezent
- d. crescent

12. Κ Α Μ Π Η Σ

- a. cadets
- b. cabens
- c. cabees
- d. cadence

13. Κ Ρ Α Ν Τ Λ

- a. cripple
- b. capald
- c. clapped
- d. cradle

14. Ρ Η Λ Η Σ

- a. peerless
- b. peleek
- c. release
- d. rupees

15. Τ Ο Ρ Ε Ν Τ

- a. topesht
- b. torrent
- c. torah
- d. torment

16. Σ Π Ο Λ

- a. crop
- b. spore
- c. spawl
- d. clod

17. Μ Π Α Ν Τ Λ Η

- a. barren
- b. badly
- c. baldy
- d. dalden

18. Ν Ο Ζ Η Ο

- a. hoeno
- b. nozeeno
- c. notion
- d. nausea

19. Ρ Α Τ Ε Ν Σ Κ

- a. pateshk
- b. rateesh
- c. ratensk
- d. patzeek

20. Π Ο Ζ

- a. pause
- b. rose
- c. loz
- d. pose

APPENDIX D

The following items have been selected to provide a representative sample of the items used in the study. The items are presented in the order in which they appear in the questionnaire.

1. I am a person who is very sensitive to the needs of others.

2. I am a person who is very sensitive to the needs of others.

3. I am a person who is very sensitive to the needs of others.

4. I am a person who is very sensitive to the needs of others.

5. I am a person who is very sensitive to the needs of others.

6. I am a person who is very sensitive to the needs of others.

7. I am a person who is very sensitive to the needs of others.

8. I am a person who is very sensitive to the needs of others.

9. I am a person who is very sensitive to the needs of others.

10. I am a person who is very sensitive to the needs of others.

11. I am a person who is very sensitive to the needs of others.

12. I am a person who is very sensitive to the needs of others.

13. I am a person who is very sensitive to the needs of others.

Appendix D: Attitude Scales

14. I am a person who is very sensitive to the needs of others.

15. I am a person who is very sensitive to the needs of others.

16. I am a person who is very sensitive to the needs of others.

17. I am a person who is very sensitive to the needs of others.

18. I am a person who is very sensitive to the needs of others.

19. I am a person who is very sensitive to the needs of others.

20. I am a person who is very sensitive to the needs of others.

21. I am a person who is very sensitive to the needs of others.

22. I am a person who is very sensitive to the needs of others.

23. I am a person who is very sensitive to the needs of others.

24. I am a person who is very sensitive to the needs of others.

25. I am a person who is very sensitive to the needs of others.

Art Attitude Scale

The following items have been prepared to permit you to indicate how you feel about art. Your answer is correct if it expresses your true feeling. In each case, draw a circle around one of the five choices which best represents your ideas as follows:

- SA---I strongly agree with the point of view expressed in the statement.
 A---I agree with the point of view expressed in the statement.
 N---I am neutral toward the point of view expressed in the statement.
 D---I disagree with the point of view expressed in the statement.
 SD---I strongly disagree with the point of view expressed in the statement.

Please answer every item.

- | | |
|-------------|--|
| SA A N D SD | 1. Art can improve a person's outlook on life. |
| SA A N D SD | 2. Art is only beneficial for those who have ability in this area. |
| SA A N D SD | 3. Self-expression through art is enjoyable. |
| SA A N D SD | 4. Art helps to release tensions. |
| SA A N D SD | 5. Art isn't very practical. |
| SA A N D SD | 6. Everyone should learn to understand art objects. |
| SA A N D SD | 7. Art is something which a person can do without. |
| SA A N D SD | 8. Good art is meaningful. |
| SA A N D SD | 9. Art is the greatest expression of the feelings of mankind. |
| SA A N D SD | 10. Art makes life more interesting. |
| SA A N D SD | 11. The money spent on art should be used for more practical things. |
| SA A N D SD | 12. Art portrays an unspeakable beauty. |
| SA A N D SD | 13. Art should be stressed less than other subjects in school. |
| SA A N D SD | 14. Looking at works of art is enjoyable. |

- SA A N D SD 15. People in general should be exposed to more art.
- SA A N D SD 16. We could do without art.
- SA A N D SD 17. Art is needed for the improvement of our culture.
- SA A N D SD 18. Art has no real value in a person's everyday life.
- SA A N D SD 19. It is necessary for everyone to have some appreciation of art.
- SA A N D SD 20. Art education should be required through the high school level.
- SA A N D SD 21. Art is necessary in our society.
- SA A N D SD 22. Art is not as important to teach in the classroom as the solid subjects--mathematics, English, etc.
- SA A N D SD 23. Art instruction is of little practical value.
- SA A N D SD 24. The average citizen should have a broad background in art.
- SA A N D SD 25. The study of art is not an essential part of a good education.

Poetry Attitude Scale

The following items have been prepared to permit you to indicate how you feel about the general topic of poetry. Your answer is correct if it expresses your true feeling. In each case, draw a circle around one of the five choices which best represents your ideas as follows:

- SA—I strongly agree with the point of view expressed in the statement.
 A—I agree with the point of view expressed in the statement.
 N—I am neutral toward the point of view expressed in the statement.
 D—I disagree with the point of view expressed in the statement.
 SD—I strongly disagree with the point of view expressed in the statement.

Please answer every item.

- | | |
|-------------|---|
| SA A N D SD | 1. Reading and reciting poetry are enjoyable activities. |
| SA A N D SD | 2. Poetry is only beneficial for those who are skillful in interpreting it. |
| SA A N D SD | 3. Poetry is a desirable means of expression and communication. |
| SA A N D SD | 4. Poetry is an important part of our education. |
| SA A N D SD | 5. Poetry is something which a person can do without. |
| SA A N D SD | 6. People in general should be exposed to more poetry. |
| SA A N D SD | 7. Poetry is not as important to teach in the classroom as any of the sciences. |
| SA A N D SD | 8. The depth of good poetry fascinates me. |
| SA A N D SD | 9. Reading poetry gives me a great feeling inside which cannot be expressed in words. |
| SA A N D SD | 10. Reading poems is a waste of time. |
| SA A N D SD | 11. Poems must have evident meaning to be of value to me. |
| SA A N D SD | 12. Some of my greatest satisfactions in school have come from studying poetry. |

- SA A N D SD 13. Generally, poems tend to be boring.
- SA A N D SD 14. The indirectness of poetry is hard to understand.
- SA A N D SD 15. Studying a new poem is very satisfying.
- SA A N D SD 16. Poetry doesn't make sense.
- SA A N D SD 17. Reading poetry doesn't appeal to me as much as reading a short story or a novel.
- SA A N D SD 18. Poetry is one of the best ways of overcoming the frustrations of day-to-day living.
- SA A N D SD 19. I like to read poetry because it relaxes me.
- SA A N D SD 20. Reading poetry isn't very enjoyable.
- SA A N D SD 21. Poetry with hidden meaning is enjoyable to read.
- SA A N D SD 22. Poetry has no real value in a person's everyday life.
- SA A N D SD 23. The time spent reading poetry should be used in doing more practical things.
- SA A N D SD 24. Poetry is enjoyed by the few "odd-balls".
- SA A N D SD 25. It is necessary for everyone to have some appreciation of poetry.
- SA A N D SD 26. Everyone's personal library should include several books containing poems.

Appendix E: Final Questionnaire for Adult Learning Project

Final Questionnaire for Adult Learning Project

The purpose of this questionnaire is to obtain some reactions from you about the adult learning project. We believe that your opinion will be most helpful in the overall evaluation of the project, and in our planning of future research projects on adult learning.

1. If before the project started, you had known what you now know about the project, which of the following statements would most accurately describe your feeling about participating in the project?

DO NOT
WRITE

- I would have been more interested in participating than I was.....1()
I would have felt no differently about participating than I did.....2()
I would have been less interested in participating than I was.....3()

5

(The following list is to be used in answering questions 2-6)

- | | |
|----------------------|--|
| 1 - State Government | |
| 2 - Insurance | |
| 3 - Stock Market | |
| 4 - Art | |
| 5 - Russian | (Greek is not included because not all participants studied it.) |
| 6 - Poetry | |
| 7 - Chemistry | |
| 8 - Solar System | |
| 9 - Sets | |

2. Which three of the topics studied were most interesting to you? Using the above list, rank the top three by putting the number of the topic you thought most interesting in the first parenthesis below, the number of the second most interesting in the second parenthesis, and the number of the third most interesting in the third parenthesis.

- Most interesting.....()
Second most interesting..()
Third most interesting...()

6

7

8

3. Rank the three topics that you feel you learned the most about in the same way that you ranked the interesting topics in the above question.

Learned most.....()	9
Learned second most.....()	10
Learned third most.....()	11

4. Which three of the topics studied were least interesting to you? Using the list on page one, rank the topics three by putting the number of the topic you considered least interesting in the first parenthesis below, the number of the second least interesting in the second parenthesis, and the number of the third least interesting in the third parenthesis.

Least interesting.....()	12
Second least interesting.....()	13
Third least interesting.....()	14

5. Rank the three topics that you feel you learned the least about in the same way that you ranked the least interesting topics in the above question.

Learned least.....()	15
Learned second least.....()	16
Learned third least.....()	17

6. Rank the ways listed below in which you might study most easily, as your preference. Place a "1" in the parenthesis following the method that you would most prefer to use, a "2" in the parenthesis following the method that would be your second choice, and so on. The method that you prefer least will have an "9" in the parenthesis following it.

Receiving individual instruction from an expert.....()	18
Viewing educational television.....()	19
Listening to a lecture.....()	20
Participating in a discussion group.....()	21
Reading a series of books and articles on a topic.....()	22
Participating in a field trip or study tour.....()	23
Studying programmed materials (such as used in the project).....()	24
Working directly with materials, procedures, or equipment being learned about.....()	25

DO NOT
WRITE

7. Please write here any suggestions you may have about how we might make any future projects, such as this one, more interesting and more convenient to attend. Actually, any thoughts or comments you have about the project will be appreciated.

8. Please describe briefly why you decided to participate in the project.

Your cooperation has been outstanding. A report of the project will be written in the Fall, and a mimeographed copy of the findings will be sent to you. Thank you.

DO NOT
WRITE

26
27
28
29
30

31
32
33
34
35